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CANADIAN DAIRY POLICIES

a research report to the

Canada

Federal Task Force on Agriculture

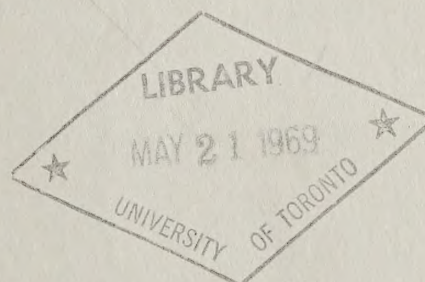
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PREFACE

The Federal Task Force on Agriculture commissioned a series of research projects in the course of its work. This report is the result of one such project.

Dr. Brian B. Perkins and Professors J. H. Clark and R. G. Marshall, all of the University of Guelph at Guelph, Ontario, formed the project team.

The Task Force has authorized preparation and publication of this report, but it should be expressly understood that the opinions, results, conclusions etc. contained herein are not necessarily those of the Task Force nor of the Canada Department of Agriculture.

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In the course of this study we have consulted many persons employed by federal and provincial governments, by universities and in industry who are knowledgeable about different aspects of the Canadian dairy industry. We are extremely grateful to all of them both for data and opinion. Obviously, however, responsibility for the contents of this report is solely our own.

J.H. Clark
R.G. Marshall
Brian B. Perkins

SUMMARY

The problems of the dairy industry stem primarily from the attempt through government policies to protect and maintain a type of agricultural production in which Canada has a marked comparative disadvantage. Throughout the post-war years federal dairy policies have supported manufacturing milk and cream prices by embargoes on virtually all dairy imports except specialty cheeses, by offers-to-purchase programmes and by other forms of subsidization. Support programmes have provided seasonally stable prices, while the year-to-year changes in dairy programmes have created uncertainties for investment in the entire industry. These economic conditions have served to encourage seasonal low investment and low output primary production, and to retard the rate of structural adjustment in both primary and processing sectors.

In response to concern about returns and incomes of dairy farmers, the federal government operates a major direct payment programme which adds \$1.16 per 100 pounds of milk to the market returns of recipient manufacturing milk shippers.

At the present time there are about 110,000 manufacturing milk and cream shippers, of which about 78,000 are shipping less than 100,000 pounds of milk equivalents annually, and about 21,000 fluid milk shippers, nearly all shipping over 100,000 pounds of milk. Excepting those small scale producers who have little alternative use for the few resources they devote to dairying, and the largest scale producers (predominantly fluid shippers) who have attained substantial economies of size, primary dairy production in Canada is characterized by high costs. The majority of producers would not be able to cover their operating costs and obtain a return on their labour and equity in dairying if federal subsidies were significantly reduced. In such an event many producers who derive a

large part of their income from dairying would face income problems, varying in severity and duration with their farm and off-farm alternatives.

To a lesser degree, firms in the processing-distributing sector are facing similar problems. Of the close to 1,300 dairy factories, about two-fifths are relatively small with annual sales of less than \$250,000. Both primary and secondary sectors are characterized by wide disparities in levels of technology and average costs.

Currently, the federal treasury costs of support programmes for manufacturing milk and cream amount to \$130 million per annum, and the consumer costs (through higher dairy product prices) exceed \$100 million. The federal government, through its agency the Canadian Dairy Commission, seemingly expects to be able to rationalize the structure of the primary dairy sector and encourage economic-sized units through existing market supports and direct subsidy programmes. This analysis in sharp contrast, indicates no prospects of substantially improving incomes from dairying or reducing the costs of assistance if present policies are maintained. Indeed, the present high levels of subsidization of milk and cream will tend to become capitalized into production costs. High prices for dairy products are providing incentives for the introduction of substitutes, which could erode dairy product markets.

In brief, the choice before the federal government is to continue a dairy policy which does little to improve the income of poor farmers or the efficiency of the dairy industry, and which incurs large treasury and consumer costs, or to adopt an alternative policy which would lower average production costs, and reduce support costs, consistent with adequate provision for the welfare of low-income families.

Recommendations

Formulation of a clear long-run policy for the dairy industry is imperative. That policy should have as its major objective the development of a competitive dairy industry, through the gradual liberalization of trade and the progressive removal of subsidies, consistent with proper compensation for existing producers of milk and cream for manufacturing use. Policy for the dairy industry should be integrated with policy for agriculture as a whole.

Poverty. It is inappropriate to deal with poverty problems by means of dairy programmes. Programmes for low-income farm families should be part of much broader anti-poverty policies.

Direct payments. Existing holders of direct payment eligibility quotas should be offered a cash payment in compensation for relinquishing their quota privileges. Remaining quotas should be made openly negotiable. The real value per unit of the direct payments should be progressively reduced. To avoid any speculation and to facilitate production planning, the nominal value of the unit payment should be announced five years in advance.

Market price supports. The level of support of prices for butter, skim milk powder, and cheddar cheese should be reduced gradually. The rate of reduction required in nominal terms will be modest as inflation lowers the real level of support.

Marketing margins. Increased efficiency in processing and distribution of dairy products should be encouraged. Specifically, federal and provincial governments should not attempt to set margins for processors or distributors through administered pricing.

Federal-provincial co-operation. The required co-operation among government agencies responsible for dairy policies includes consultation on policy formulation, consistency among programmes, and removal of its inequities arising out of discrimination between fluid and other milk shippers. In the latter regard, provincial governments should undertake to establish regional price pools for grade A milk and provide non-fluid shippers with the opportunity of entry into such pools. The federal government should encourage such provincial programmes, not create disincentives for entry. Specifically, in regions where pools exist shippers should be permitted to hold direct payment quotas and receive payments on all shipments in excess of 125 per cent of their sales at class I prices.

Policy planning and administration. The dual functions of policy development and programme administration at present undertaken by the Canadian Dairy Commission should continue to be responsible for programme administration, and responsibility for policy planning should be discharged by another agency. Such a separation of responsibilities is essential to the development of sound dairy policy, including regular evaluation of programmes, and the formulation of programme changes.

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I. THE STRUCTURE AND INCOME PROBLEMS OF THE PRIMARY SECTOR

(i) Introduction

The Canadian dairy industry includes a very large number of primary producers. In 1966 there were about 190,000 producers (Table I.1); that is, close to one-half of the Census count of farmers had income from sales of dairy products. Most of these producers were located in Quebec and Ontario, but the three Prairies provinces also accounted for a large proportion of the total. The majority of dairy farmers were cream shippers, a group of predominantly small output producers (Table I.2). These shippers were a significant part of the total in all provinces except British Columbia. Manufacturing milk shippers were numerically important only to Prince Edward Island, Quebec and Ontario. Not surprisingly, the number of fluid shippers varied roughly in proportion to the provincial population.

Typically the dairy enterprise in Canada is on a small scale. In the Maritimes and the Prairies at least two-thirds of the producers shipped less than 48,000 pounds per year, the equivalent of fewer than 8 average yielding cows and of less than \$2,500 in gross returns per farm (Table I.2). Even in Quebec and Ontario fully one-third of the shippers were in this low sales class; British Columbia with less than one-quarter of its shippers in this class was an exception. The great majority of these smallest scale producers were cream shippers, and the relative importance of cream shipping declined markedly with output. By contrast fluid milk shippers were heavily concentrated in the 96,000 pounds and over output class, and were almost absent in the smallest class. Only Quebec, Ontario and, to a lesser extent, Prince Edward Island, had a substantial proportion of manufacturing milk shippers. These shippers were intermediate in scale of output between cream and fluid shippers.

Table I.1. The Distribution of Dairy Farms
by Type of Shipper and Province, 1966^a.

	<u>Cream</u>	<u>Manufactured</u>	<u>Fluid</u>	<u>Total</u>
Prince Edward Island	3,042	1,007	110	4,159
Nova Scotia	2,350	201	1,287	3,838
New Brunswick	2,847	428	720	3,995
Quebec	16,571	41,748	5,494	63,813
Ontario	15,466	22,203	7,525	45,194
Manitoba	15,803	716	1,234	17,753
Saskatchewan	23,453	12	776	24,241
Alberta	23,389	1,950	1,423	26,762
British Columbia	<u>614</u>	<u>294</u>	<u>2,079</u>	<u>2,985</u>
Total	103,535	68,559	20,648	192,740

^a. Source: William Mackenzie, The Canadian Dairy Industry, ARDA Project No. 15033, Canada Department of Forestry and Rural Development and adjustments for numbers of fluid shippers based on data from the 1966 Census of Agriculture calculated as a part of this project. Mackenzie's data on manufacturing milk and cream shippers double-counted about 7,000 producers who shipped both milk and cream. Since most of these shippers probably shifted from cream to manufacturing milk shipment during the dairy year, it is primarily the number of cream shippers which were overestimated.

Table I.2. The Shipping Volume Distribution
by Type of Shipper and Province, 1966^a.

<u>Province</u>	<u>Shipping Volume</u> lbs. per annum	<u>Cream</u> - - per cent of all dairy farms	<u>Manufacturing</u> - - per cent of all dairy farms	<u>Fluid</u> - - per cent of all dairy farms	<u>Total</u> - - per cent of all dairy farms
Prince Edward Island	under 48,000	54	14	(-)	69
	48,000-95,999	15	7	(-)	22
	96,000 and over	4	3	2	9
	Total	73	24	3	100
Nova Scotia	under 48,000	55	3	4	62
	48,000-95,999	5	1	7	14
	96,000 and over	1	1	22	24
	Total	61	5	34	100
New Brunswick	under 48,000	56	6	1	63
	48,000-95,999	12	3	3	18
	96,000 and over	3	2	14	19
	Total	71	11	18	100
Quebec	under 48,000	18	23	(-)	41
	48,000-95,999	7	20	1	28
	96,000 and over	2	22	7	31
	Total	26	65	9	100
Ontario	under 48,000	22	10	(-)	33
	48,000-95,999	9	12	1	21
	96,000 and over	3	27	16	46
	Total	34	49	17	100
Manitoba	under 48,000	75	2	(-)	78
	48,000-95,999	12	1	(-)	13
	96,000 and over	2	1	7	9
	Total	89	4	7	100
Saskatchewan	under 48,000	90	(-)	(-)	90
	48,000-95,999	6	(-)	(-)	6
	96,000 and over	1	(-)	3	4
	Total	97	(-)	3	100
Alberta	under 48,000	69	2	(-)	71
	48,000-95,999	15	2	(-)	17
	96,000 and over	4	3	5	12
	Total	87	7	5	100
British Columbia	under 48,000	18	4	(-)	23
	48,000-95,999	2	3	16	20
	96,000 and over	(-)	3	54	57
	Total	21	10	70	100
Canada	under 48,000	43	11	(-)	54
	48,000-95,999	6	10	1	20
	96,000 and over	2	14	9	26
	Total	54	36	11	100

^aSource: see Table I.1 footnote.

(-) less than .5 per cent. Percentages do not add exactly to totals in some cases because of rounding.

This profile of the primary sector raises the obvious question as to whether the large number of small producers are heavily dependent on milk and cream sales as a source of income.

(ii) The dependence on dairying as a source of income.

The average proportion of farm cash receipts derived from sales of dairy products^{*} in the period 1964-66 varied considerably among provinces (Table I.3, Row 1). In the Prairies dairying was clearly a minor enterprise, in Prince Edward Island it accounted for about one-seventh of farm cash receipts, and in other provinces from one-fifth to over one-third in Quebec. These data, however, provide little indication of the import of dairying to dairy farmers. Information from the 1961 Census of Agriculture shows that a relatively high proportion of both commercial^{**} and non-commercial farmers reported revenue from dairying in all provinces (Table I.3, Row 2). The proportion reporting dairy revenue was higher among the commercial than among other farms in all provinces. The inference is that dairying is typically a small scale enterprise but is less commonly found on the smallest output farms. Commercial farm data from the 1966 Census clarifies the picture considerably (Table I.3, Row 3). It shows that the proportion of farms deriving most of their revenue from dairying averaged 20 per cent for the nation, and ranged from a low of 1 to 5 per cent in the Prairie provinces to a high of 63 per cent in Quebec. It appears that though many farms have a dairy enterprise, only in the province of Quebec do farmers have a very high degree of dependence on dairy income, although dairy is clearly a prevalent type of farm in Nova Scotia, New Brunswick and Ontario. The relation between the proportion of income derived from dairying and the output size of the dairy farm can be examined in greater detail using data from the 1961 Census, by expressing the average value of sales of milk and cream as a percentage of the average value of sales of

* The output of meat animals from dairy enterprises is excluded in this analysis.

** The term "commercial farm" as used in this section is synonymous with the 1966 Census definition of a farm reporting sales of \$2,500 and over. The expression is used for its convenience and not because such a farm is truly commercial.

Table I.3. Measures of the Degree of Dependence on Dairying
as a Source of Farm Cash Receipts, by Province.^a

	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alb.	B.C.	Canada
1. Per cent farm cash receipts from dairying, 1964-66	14.7	24.9	21.2	36.0	19.4	6.8	2.3	6.0	22.0	14.5
2. Per cent of farms reporting dairy sales - 1961										
-commercial farms	79.9	70.3	70.6	88.6	58.0	45.7	35.0	46.2	37.7	53.6
-non-commercial farms	56.1	41.6	50.4	73.7	29.6	42.0	24.5	27.7	11.7	39.5
-total	65.5	48.5	55.7	73.9	45.7	44.2	31.6	39.2	22.3	47.1
3. Dairy type commercial farms as a per cent of all commercial farms, 1966	11.7	45.0	32.6	63.4	29.9	4.5	.8	4.3	24.5	20.4
4. Per cent dairy cash receipts by economic class of dairy farm, 1961										
under \$2,500	41.0	59.0	82.8	76.8	69.9	32.2	19.1	29.5	73.8	54.1
\$ 2,500- 4,999	26.0	57.8	42.2	56.9	44.9	22.3	11.4	17.4	69.9	36.3
\$ 5,000- 9,999	23.7	60.3	48.1	56.6	47.3	16.9	9.1	14.8	83.2	35.7
\$10,000-14,999	19.8	54.4	44.9	55.8	51.7	22.3	11.6	19.7	82.4	41.5
\$15,000 & over	13.8	22.1	29.6	26.9	32.1	21.3	13.8	16.0	59.6	29.0

^a Sources: 1. Farm Cash Receipts, Dominion Bureau of Statistics Cat. #21-001.
2,4. Census of Canada, 1961, Vol. V, Dominion Bureau of Statistics Cat. #96-530 through 96-540.
3. Census of Canada, 1966, Advance Bulletin, Dominion Bureau of Statistics Cat. #96-624.

all agricultural products for farms in each economic class (Table I.3, Row 4). The relation is not consistently monotonic among provinces, but the non-commercial dairy farms were most dependent, and the largest dairy farms tended to be least dependent, on dairy cash receipts. More marked were the differences among provinces. British Columbia dairy producers in all economic classes exhibited a high degree of dependence; Quebec producers in all but the largest economic classes also were heavily dependent on dairying. At the other extreme, Prince Edward Island and the Prairie provinces, especially Saskatchewan, were much less dependent on dairy product sales.

Information on the share of total cash receipts derived from the dairy product sales is also available from a special survey of manufacturing milk and cream shippers conducted by the Canada Department of Agriculture in 1966.* The omission of fluid shippers (who tend to be the largest output producers) confines the survey data to the small to medium dairy enterprises. These data provide estimates of the distribution of such dairy farms by degree of dependence on dairy cash receipts (Table I.4). This evidence is consistent with the Census data just examined. It indicates that only about 36 per cent of the non-fluid dairy shippers in Canada derived one-half or more of their cash receipts from milk and cream sales, and that about an equal number obtained less than one-quarter of their cash receipts from this source. Moreover, even this degree of dependence is characteristic only of producers in New Brunswick, Quebec, Ontario and British Columbia. Quebec had the highest percentage of producers with at least one-half their income from dairy products (53 per cent); Ontario had the second highest (47 per cent). In the Prairies the great majority of producers derived less than one-quarter of their cash receipts from dairy products.

* W.J. White and V.A. Heighton, The Structure of the Canadian Manufacturing Milk and Cream Industry, Canada Department of Agriculture, March, 1968.

Table I.4. Share of Total Cash Receipts from the Sale
of Milk and Cream, Canada and Provinces, 1966^a.

	<u>Less than 25%</u>	<u>25-49%</u>	<u>50-74%</u>	<u>75-100%</u>
	- - - - -	percentage	- - - - -	- - - - -
Canada	37	27	19	17
Prince Edward Island	31	46	16	7
Nova Scotia	47	27	14	12
New Brunswick	30	36	21	14
Quebec	36	31	28	25
Ontario	25	28	22	25
Manitoba	58	25	9	8
Saskatchewan	77	16	4	4
Alberta	62	24	8	6
British Columbia	41	24	14	21

^aSource: W.J. White and V.A. Heighton, The Structure of the Canadian Manufacturing Milk and Cream Industry, Canada Department of Agriculture, March, 1968.

As already noted, cream shippers typically were small scale producers.

Table I5 provides Canada Department of Agriculture estimates of the distribution of these shippers by the percentage of dairy income. The degree of dependence of this smallest output class of shipper is clearly less than that of other shippers. In Quebec, one-half of the cream shippers derived most of the farm income from dairy product sales, but elsewhere the proportion ranged from 7 per cent in Saskatchewan to 27 per cent in New Brunswick.

The Canada Department of Agriculture survey is the only source of information on the relation between dependence on dairying and the size of the dairy operation. The relation is shown in Table I.6 using size of dairy herd as a measure of enterprise size. As expected, the extent of specialization rises with herd size. Only 15 per cent of the producers with 1-7 cow herds obtained most of their income from milk/cream sales, for herds of 18-25 cows the proportion was 63 per cent, while among herds of over 50 cows 80 per cent of the producers derived most of their income from the enterprise. Conversely, two-thirds of the producers with 1-7 cow herds derived less than one-quarter of their income from dairy product sales. Superficially, this relation appears to be a contradiction of the negative relation between percentage dairy income and economic class. In fact these relations indicate that the smaller dairy enterprises are often supplementary enterprises on the large output farms, and further that the larger cream and manufacturing milk enterprises are not typically located on the largest output farms. The increase in dependence on milk and cream sales with size of dairy enterprise was also apparent within provinces, but the average relation at the national level was accentuated by the large number of small scale producers (typically cream shippers) in the Prairies, and by the majority of larger scale producers being located in the specialized manufactured milk and cream producing areas, notably Ontario and Quebec.

Table I.5. Share of Cash Receipts from the Sale of Cream,
Canada and Provinces, 1966^a.

	<u>Less than 25%</u>	<u>25-49%</u>	<u>50-74%</u>	<u>75-100%</u>
	per cent of farmers			
Canada	48	29	14	9
Prince Edward Island	34	47	14	5
Nova Scotia	49	26	14	11
New Brunswick	33	38	17	12
Quebec	17	33	30	20
Ontario	47	36	11	6
Manitoba	58	26	9	7
Saskatchewan	75	18	4	3
Alberta	64	25	7	4
British Columbia	48	29	15	8

^a. Source: see Table I.4.

Table I.6. Share of Total Cash Receipts from Milk and Cream Sales
by Number of Cows Milked, Canada, 1966^a.

<u>Number of Cows Milked</u>	<u>Less than 25%</u>	<u>25-49%</u>	<u>50-74%</u>	<u>75-100%</u>
	percentage			
1 - 7	65	20	8	7
8 - 17	22	37	24	17
18 - 25	10	27	31	32
26 - 50	10	18	27	45
Over 50	11	11	24	55

^a. Source: see Table I.4.

As Yang has noted, cream and manufacturing milk producing farms are characteristically mixed farms.* In the Prairies, the cream or manufacturing milk enterprise commonly occurs on grain farms, though the enterprise also occurs on livestock farms in Alberta. Cream production in Canada is typically combined with a hog enterprise to use the skim milk. In Ontario especially, hog production is commonly associated with both cream and manufacturing milk production. In Quebec and the Maritimes livestock raising, particularly hogs, occurs frequently with dairying; Prince Edward Island is exceptional in also having a significant cash crop enterprise as a typical combination with dairying.

Traditionally, small scale milk and especially cream production has been a by-product of beef enterprises in some parts of Canada. This association is still found in the Prairies and to a lesser extent in Ontario, but is of declining importance.

The dependence of dairy farmers on income from milk and cream sales should, for the purpose of welfare assessment, be gauged against off-farm as well as other farm earnings. A measure of the extent of off-farm earnings is provided in the 1961 Census and the 1966 Canada Department of Agriculture dairy survey data on days of off-farm employment. Table I.7 provides Census based estimates of the incidence of off-farm work among farmers who derived most of their farm income from dairying and whose total sales of agricultural products was \$1,200 or greater. Dairy farmers were less likely to have worked off their farms than other farmers, and those who did worked fewer days in off-farm jobs, undoubtedly because of the regular year round employment provided by the dairy enterprise. The importance of off-farm earnings was greater to dairy farmers in Nova Scotia, New Brunswick and Quebec than to those in other provinces, reflecting both the lower farm income levels and the opportunities for such employment. In the Prairies the incidence

* W.Y. Yang, "Other Sources of Income on Cream and Manufacturing Milk Producing Farms in Canada," Canadian Farm Economics, June, 1968.

Table I.7. The Incidence of Multiple Jobholding Among Dairy
and Among All Farmers with Sales of \$1,200 and Over,
by Province, 1961^a.

	Per Cent with Off-farm Jobs		Days Off-farm Work per Multiple Job Farmer	
	<u>Dairy</u>	<u>All farmers</u>	<u>Dairy</u>	<u>All farmers</u>
Prince Edward Island	19.7	23.7	121	122
Nova Scotia	31.6	38.0	111	129
New Brunswick	31.7	34.0	113	122
Quebec	29.4	29.8	100	105
Ontario	22.6	27.4	127	139
Manitoba	15.3	18.1	106	114
Saskatchewan	12.4	17.5	84	118
Alberta	17.2	20.3	120	121
British Columbia	24.6	34.3	146	160

^a. Calculated from Census of Canada, 1961, Vol. V, using data on "commercial" farms (defined in 1961 as having sales of \$1,200 and over). Dairy farms are those on dairy type farms (defined as reporting 51 per cent cash receipts from dairy).

of multiple jobholding was low. Much the same conclusions were reached by Yang based on examination of the 1966 Canada Department of Agriculture dairy survey data. Those data also indicated a negative relation between share of income from dairying and incidence of multiple jobholding, and between size of dairy herd and incidence of off-farm work.

(iii) Rural poverty and dairying

The importance of dairying in such relatively low-income provinces as the Maritimes and Quebec is clear (Table I.3). But the correlation between the distribution of rural poverty and dairying must be examined more closely for the purpose of policy prescription. The relationship is examined in greater detail by using Census divisions as the area observation unit. Using the ARDA definition of low-income farmers,^{*} Census divisions were classified according to the proportion of such farmers in 1961. This measure of poverty, which can be regarded as gauging the incidence of hard core farm poverty, was tabulated against the percentage of farms with dairy product sales in the division, in each of seven regions^{**} (Table I.8). The tabulation shows a definite correlation between poverty and dairying. With few exceptions, the proportion of farmers with dairy sales in divisions with over 20 per cent low-income farmers was higher than in the region as a whole. In Quebec only the divisions in the 30.1-40.0 per cent low-income class had above average numbers of farmers reporting dairy sales, and in British Columbia the relation did not hold at all, reflecting the high degree of commercialization of that province's dairy industry.

Thus it can be concluded that the low-income farming areas do depend more heavily on dairying than other areas. The answer to the corollary of this question, namely, are dairy farms located primarily in low-income farming areas, is also in the affirmative. In the Maritimes nearly all the farms reporting

* Farmers who worked less than 25 days off their farms, and whose farms had a capitalized value of less than \$25,000 with sales of less than \$2,500.

** The Maritime provinces were grouped into one region because these provinces

dairying were located in divisions with over 20 per cent farmer poverty; in Quebec 89 per cent of dairy farms were in such areas; in Manitoba, Saskatchewan and Alberta, the proportions were 52 per cent, 65 per cent, and 46 per cent, respectively. Only Ontario and British Columbia had fewer than 30 per cent of the farmers reporting dairy sales in such low-income divisions. The significance of these distributions is that the alternatives open to dairy farmers are in general fewer than to producers facing adjustment problems in more prosperous areas.

Table I.8. The Proportion of Farmers with Dairy Product Sales Classified by the Incidence of Low-income Farmers, by Region^a.

Region	Census Divisions Classified According to Percentage of Low-income Farmers: ^b			All Census Divisions
	20.1-30.0	30.1-40.0	40.1 & over	
	- per cent of farms reporting dairy product sales -			
Maritimes	50.0	58.0	58.3	55.1
Quebec	70.8	76.2	68.8	73.9
Ontario	53.3	67.1	c.	45.7
Manitoba	51.9	45.7	57.9	44.2
Saskatchewan	41.1	44.9	c.	31.6
Alberta	40.1	46.9	c.	39.2
British Columbia	16.5	c.	c.	22.3

^a Source: Map No. 3 of the series "Economic and Social Disadvantage in Canada," compiled by Agricultural and Rural Development Administration, Canada Department of Forestry, September 1964; and estimates based on Census of Canada, 1961, Vol. V.

^b Farmers who worked less than 25 days off their farms, and whose farms had a capitalized value of less than \$25,000 and sales of less than \$2,500.

^c One or no Census divisions in 'low-income farms' class.

(iv) Yields and levels of technology

About 9 per cent of the milk produced on Canadian farms is used either to feed livestock or for farm home consumption, and in some regions this proportion is very much higher. Data on both these types of utilization are more unreliable than those for milk sold off farms. Moreover, many farmers produce milk for on farm use only and consequently cannot be meaningfully considered as part of the dairy industry. For these reasons yield in this study was measured as pounds of milk sold per annum per milk cow. This measure tends to understate the physical output per cow, particularly in the smallest and least commercialized dairy enterprises.

Average sales per cow vary considerably among the provinces (Table I.9). These variations reflect differences in herd size distribution, in the extent to which production is seasonal and geared toward cream and manufacturing milk production, in cow breeds, etc. Manitoba and Saskatchewan which are especially heavily oriented to small scale cream production exhibit the lowest yields; Ontario and British Columbia, with a much higher proportion of medium to large shippers, have the highest yield levels (Tables I.2, I.9). Given that 10,000 pounds per cow is a readily attained physical output level for a commercial dairy herd, these comparisons indicate the relatively low levels of yields typically experienced in all provinces except British Columbia, and to a lesser extent, Ontario.*

In an attempt to identify sources of provincial variation in yields, average sales per cow by herd size and by manufacturing or cream shipper are shown also in Table I.9. These data, derived from the 1966 Canada Department of Agriculture dairy survey,** do not include fluid shippers. Consistent with the presumption that specialization increases with herd size, yields did typically

* Average production per cow is, of course, higher than sales per cow in all provinces, but differences among provinces are not significantly explained in terms of variation in sales/production ratios.

** Data taken from the 1966 Canada Department of Agriculture Dairy Survey.

Table I.9. Average Sales Per Cow, All Shippers, by Herd Size
and Type of Shipper, by Province, 1966^a.

	<u>P.E.I.</u>	<u>N.S.</u>	<u>N.B.</u>	<u>Que.</u>	<u>Ont.</u>	<u>Man.</u>	<u>Sask.</u>	<u>Alb.</u>	<u>B.C.</u>	<u>Can.</u>
Average sales per cow (lbs.)	5,339	5,745	5,853	5,562	6,905	4,461	4,084	5,455	9,647	5,982
Mfg. Milk Herds										
3 - 7 cows	5,236	4,538	5,516	4,871	7,601	5,489	b.	7,159	8,133	5,793
8 - 12 "	7,557	6,356	4,523	5,096	6,955	5,363	b.	6,701	8,846	5,694
13 - 17 "	6,438	6,037	5,681	5,280	7,666	6,575	b.	7,457	8,851	6,040
18 - 32 "	6,993	6,775	7,338	5,471	8,005	6,703	b.	7,314	10,153	6,456
33 - 47 "	b.	b.	b.	5,641	8,043	b.	b.	6,342	b.	6,744
48 - 62 "	b.	b.	b.	5,339	8,307	b.	b.	b.	b.	6,998
over 62 "	b.	b.	b.	b.	b.	b.	b.	b.	b.	b.
Cream Herds ^c .										
3 - 7 cows	5,600	5,171	5,629	6,371	6,286	5,086	4,914	5,286	5,771	5,429
8 - 12 "	6,114	5,743	4,943	5,114	4,657	4,657	4,440	5,400	6,571	5,229
13 - 17 "	6,657	5,857	5,143	5,029	6,314	4,343	4,571	5,571	6,343	5,314
18 - 32 "	7,800	5,857	5,200	4,857	6,057	4,429	5,029	5,343	b.	5,086
33 - 47 "	b.	b.	b.	4,514	b.	b.	b.	b.	b.	4,629
over 47 "	b.	b.	b.	b.	b.	b.	b.	b.	b.	b.

^a. Overall provincial averages derived from Dairy Statistics, D.B.S., Cat.#23-201, herd size distributions data provided by Canadian Dairy Commission and based on 1966 C.D.A. dairy survey.

^b. Sample size too small for reliable estimate.

^c. Data in lbs. butterfat converted to milk equivalents on basis of 3.5 per cent butterfat content.

rise with the size of herd, but exceptions to this relation were common, especially among cream shippers. In many provinces enlarged herd size appeared to be a substitute for higher yields as a means of increasing cream output. Partial information from many sources indicates that fluid milk herds, which are oriented to year round production, usually have much higher average sales per cow. Cream shippers, who are typically the most seasonal dairy producers, characteristically had lower sales per cow than manufacturing milk shippers with the same herd size (Table I.9). In summary, it appears that variation in milk yields were mainly associated with the type of market to which producers shipped, to a lesser extent with the size of dairy herd, and that yields varied among provinces also as a result of other factors.

Low yields per cow is one facet of low dairying income. Another, with which it is evidently correlated, is low levels of technology. Once again the 1966 dairy survey is the source of most detailed information (Table I.10). In interpreting these data it should be borne in mind that fluid shippers, who are not included, would typically have higher levels of technology. Perhaps the most striking indicator of low levels of technology is that nearly one-half of all shippers milked by hand. Regional variation was considerable, with less than one-third of the shippers in Nova Scotia, Manitoba, and Saskatchewan, using milking machines and over three-fifths of the shippers in Quebec and Ontario having milking machines. In no province did more than 5 per cent of the shippers use pipeline milkers, and bulk tanks were used to a significant degree only in Quebec, Ontario and British Columbia. The latter provinces also lead in the incidence of can coolers, but again fewer than one-third of all shippers employed such equipment. "Record of Performance" or "Dairy Herd Improvement Association" shippers were uniformly insignificant in number, and typically a minority of producers used artificial insemination; Prince Edward Island had a higher proportion of producers using these practices than any other province. White,^{*} in his study of dairy

* W. James White, "The Adoption of Modern Dairy Practices," Canadian Journal of Agricultural Economics, Vol. 16, No. 1.

Table I.10. Levels of Dairy Technology: The Incidence of Modern Equipment and Practices on Manufacturing Milk and Cream Enterprises, by Province, 1966^a.

<u>Per Cent of Dairy Enterprises with:</u>	<u>P.E.I.</u>	<u>N.S.</u>	<u>N.B.</u>	<u>Que.</u>	<u>Ont.</u>	<u>Man.</u>	<u>Sask.</u>	<u>Alb.</u>	<u>B.C.</u>	<u>Canada</u>
Electric milking machines	42	30	51	63	74	21	14	41	47	54
Pipeline Milker	5	1	5	2	5	1	x	2	4	3
Bulk Tank	1	x	2	13	12	x	x	2	10	8
Can Cooler	20	12	15	40	34	13	6	15	28	29
R.O.P. or D.H.I.A.	14	4	7	7	7	4	4	4	7	6
Artificial Insemination	72	52	41	24	59	35	26	35	64	36

^aSource: W. James White, "The Adoption of Modern Dairy Practices," Canadian Journal of Agricultural Economics, Vol. 16, No. 1, p.30.

^xLess than one per cent.

technology, attempted to account for the incidence in use of these practices in terms of dairy herd size, share of farm income from dairy, age of operator, type of market and other factors. Simple correlation revealed few strong relationships; an exception was a positive correlation between herd size and the incidence of milking machines and of can coolers.

(v) The changing structure of the primary sector

Although the Canadian dairy industry is currently characterized by a large number of small primary producers, employing low levels of technology and with limited dependence on dairying income, very considerable declines in the numbers of small producers, and rapid expansion in the number of large producers, have occurred in the post-war years. Historical comparisons of the structure of the primary sector are possibly only on the basis of herd size distributions. Such data are presented in Table I.11 by province for Census years. The total number of milk herds in Canada halved in the period 1951-66, a considerably more

Table I.11. The Changing Structure of the Primary Dairy Sector: The Distribution of Farms Reporting Milk Cows by Herd Size, by Province, 1951, 1961, and 1966^a.

No. of Cows	CANADA				PRINCE EDWARD ISLAND				NOVA SCOTIA			
	1951	1961	1966	Change 1951-66 %	1951	1961	1966	Change 1951-66 %	1951	1961	1966	Change 1951-66 %
1 - 2	134,463	65,356	47,449	-65	2,703	1,198	806	-70	9,371	3,421	2,126	-77
3 - 7	186,907	95,904	55,997	-69	5,005	2,951	1,754	-65	7,140	3,451	1,843	-74
8 - 12	85,250	64,595	39,006	-54	951	1,435	1,322	+39	1,819	1,274	794	-56
13 - 17	31,001	36,519	26,529	-14	126	382	483	+283	555	645	424	-24
18 - 32	20,758	37,866	38,636	+86	48	159	273	+469	308	684	663	+115
33 - 47	2,033	6,424	10,002	+392	5	11	31	+520	29	100	186	+541
over 47	656	2,316	4,231	+545	0	1	6	-	9	36	68	+655
Total	455,068	308,980	221,850	-51	8,838	6,137	4,675	-47	19,251	9,611	6,104	-68
NEW BRUNSWICK												
1 - 2	9,544	2,489	1,360	-86	22,042	6,529	4,091	-81	20,999	9,699	6,004	-71
3 - 7	7,460	3,714	1,951	-74	36,086	17,317	9,193	-75	33,895	14,426	8,014	-76
8 - 12	1,800	1,566	1,030	-43	30,121	22,852	13,159	-56	28,797	16,341	9,229	-68
13 - 17	504	673	517	+3	12,575	16,255	12,693	+1	12,630	12,079	7,673	-39
18 - 32	384	621	559	+46	7,867	15,285	18,287	+132	9,238	15,937	14,220	+54
33 - 47	40	100	140	+250	607	1,849	3,595	+495	886	3,240	4,610	+420
over 47	19	48	72	+279	145	422	1,002	+591	242	1,127	2,115	+774
Total	19,751	9,211	5,629	-72	109,443	80,509	62,020	-43	106,687	72,849	51,865	-51
QUEBEC												
ONTARIO												

. . . cont.

ble I.11 (cont.)

No. of Cows	1951			1961			1966			1951			1961			1966			Change 1951-66			Change 1951-66		
	number			number			number			number			number			number			%			%		
							MANITOBA									SASKATCHEWAN								
1 - 2	11,025	6,091	4,612	-58	28,724	17,522	13,527	-53	20,737	14,040	11,409	-45	20,737	14,040	11,409	-45	20,737	14,040	11,409	-45	20,737	14,040	11,409	-45
3 - 7	19,545	11,723	7,623	-61	37,939	22,409	13,137	-65	37,939	22,409	13,137	-65	37,939	22,409	13,137	-65	37,939	22,409	13,137	-65	37,939	22,409	13,137	-65
8 - 12	6,527	5,747	3,828	-41	6,951	6,735	3,743	-46	6,951	6,735	3,743	-46	6,951	6,735	3,743	-46	6,951	6,735	3,743	-46	6,951	6,735	3,743	-46
13 - 17	1,571	2,000	1,424	-9	11,118	1,558	853	-24	11,118	1,558	853	-24	11,118	1,558	853	-24	11,118	1,558	853	-24	11,118	1,558	853	-24
18 - 32	849	1,475	1,235	+45	521	849	653	+25	521	849	653	+25	521	849	653	+25	521	849	653	+25	521	849	653	+25
33 - 47	100	192	294	+194	30	105	138	+360	30	105	138	+360	30	105	138	+360	30	105	138	+360	30	105	138	+360
over 47	45	85	142	+216	14	44	93	+564	14	44	93	+564	14	44	93	+564	14	44	93	+564	14	44	93	+564
Total	39,662	27,313	19,158	-52	75,297	49,222	32,144	-57	75,297	49,222	32,144	-57	75,297	49,222	32,144	-57	75,297	49,222	32,144	-57	75,297	49,222	32,144	-57
							BRITISH COLUMBIA																	
1 - 2	7,918	3,720	3,144	-60																				
3 - 7	3,732	1,603	950	-75																				
8 - 12	1,414	704	319	-77																				
13 - 17	708	597	253	-64																				
18 - 32	787	1,220	938	+19																				
33 - 47	188	411	502	+167																				
over 47	89	265	346	+289																				
Total	14,856	8,720	6,452	-56																				

a. Source: Census of Canada, 1951, 1961, and 1966.

rapid rate than the 31 per cent reduction in total numbers of farms in the same period. These declines were largely confined to herds of less than 13 cows, whereas herds of 33 cows and over increased in number severalfold.

Rising wage rates and increasing preference for leisure time have added considerably to the cash costs and disadvantages of the daily labour requirements of milk production, and have thus served to encourage withdrawal from the dairy enterprise. The marked decline in the number of herds of less than 13 cows is attributable mainly to the decline in cream shippers. Bulk transportation has increased the distances over which milk can be shipped profitably from farms to plants, and this development together with the inability of many small creameries to compete have served to reduce the market for farm separated cream. At the same time more profitable alternatives, such as wheat in the Prairies, and other livestock enterprises in the East, have also attracted farmers out of cream production. Cream production, as a small scale enterprise which provides a useful income supplement, a means of using surplus family labour in the early summer and a source of feed for other livestock, tends to lose these advantages when expanded since it then competes for resources, including managerial skill, and requires a complementary enlargement of livestock enterprises. These trends are bound to continue, and will lead to the virtual disappearance of small scale cream enterprises. Small scale shippers of milk to both manufacturing and fluid markets also have declined in number. Manufacturing shippers have been similarly affected by bulk transportation and plant centralization, and by the economic pressures for adjustment consequent on declining product-input price ratios. Moreover, their access to fluid markets has been limited in most provinces. Fluid shippers for the most part have had good markets for expanded output and have accounted for most of the growth in the larger herd sizes. These comparisons suggest that, dramatic as the changes in the structure of the dairy sector have been, rapid adjustment will have to continue if rationalization of the sector is to occur in the next decade.

(vi) Costs, returns and income problems

One of the salient features of income problems in agriculture is the paucity of information on income, attributable in large part to the failure of farmers to keep adequate business accounts. As a consequence the bases of income issues often are presumed rather than substantiated. Data problems are even worse when a single enterprise such as dairying is considered, because of the difficulties of allocation of costs which are shared with other enterprises, and of valuation of enterprise products which are used as inputs for other enterprises on the farm. Finally, it should be noted that the available farm account data is representative of above average farm businesses.

This analysis of costs and returns to dairying draws on farm account data on fluid milk farms in all regions, on manufacturing milk farms in Quebec and Ontario, and on other data relating to dairying income from various sources, including the assessments of persons knowledgeable about the situation of the enterprise in their province. For the purpose of this analysis three types of dairy enterprises were distinguished:

- (a) fluid milk farms
- (b) manufacturing milk farms where dairying is the major enterprise
- (c) manufacturing milk and cream farms where dairying is combined with other enterprises.

(a) Fluid milk farms are located predominantly near urban centres.

All provinces have legislation which provides for restricted entry into the fluid market, but while prices received for quota sales are higher than those in manufacturing markets, fluid shippers must ship on a year round basis and meet relatively high standards of milk quality. Because of their location, land and labour costs are typically higher on fluid milk farms. These factors have resulted in above average dairy managers who treat dairying as a major enterprise. Commonly these farms combine dairying with at least one other enterprise, a crop enterprise providing most of the feed for the dairy herd.

Summaries of milk production costs and returns on such farms on a per hundredweight of milk sold basis are presented in Table 12. Direct expenses include all purchased feed costs, home grown feed valued at farm prices, and other direct costs for the dairy herd. Overheads are separated into those directly associated with the dairy herd and other. The item "contribution to overhead" represents the return to cover such costs and the return to management. In relation to the investment in dairying we estimate this contribution must be at least 11-12 per cent, excluding a return to management, for the enterprise to be competitive. For the high yield per cow levels attained by these farms, feed and other direct costs are high, typically amounting to more than half the total gross return. Investment per cow ranges widely but total investment in the dairy enterprise typically is \$30,000 to \$35,000, and the total farm investment is \$75,000 to \$100,000. Cash receipts from dairying alone are in excess of \$20,000 and total net farm income is of the order of \$7,000 to \$15,000. These large, specialized dairy operations have been competitive at the prices prevailing in recent years and yield incomes for the families operating them which are well above the national average. To the extent that these samples provide inter-provincial comparisons, total farm investment, size of dairy business, and net farm income are lower on such farms in Quebec and the Maritimes. Since cow yields were also lower, the differences may reflect lower managerial ability in these regions. The Saskatchewan farms are exceptional in that dairying is combined with a very large cash grain enterprise. Recent farm account information on British Columbia is not available, but from interviews with dairy specialists in that province it appears that the levels of investment and management typically are very high and that dairying, based preponderantly on the fluid market, yields high returns.

Dairy production for a fluid market requires a substantial amount of capital and well-trained labour on a year-round basis. Rising interest rates, capital appreciation (especially of land) and steadily increasing wage rates have

Table I.12. Costs and Returns on Fluid Milk Farms, by Province^a.

	Nova Scotia 1965	Quebec 1966	Ontario		Saskatchewan		Alberta		British Columbia 1961
			1966	1967	1966	1967	65/66	66/67	
Number of farms	99	86	207	118	28	13	51	61	140
Cows per farm	24.4	28.0	33.1	35.1	29.4	32.2	44.8	44.0	28.0
Milk sold/cow (lbs.)	7276 (est.)	8755	9077	9759	9664	10,472	9452	9847	9229
<u>Income per cwt. sold</u>									
Milk (\$)	5.14 (est.)	4.74	5.28	5.59	5.66	5.67	4.74	4.93	4.79
Livestock credit (\$)	.66	.67	1.10	1.27	.95	1.04	.66	.81	.43
Total (\$)	5.80	5.41	6.38	6.86	6.61	6.71	5.40	5.73	5.22
<u>Expenses & net returns per cwt. sold</u>									
Feed & other direct (\$)	-	-	3.81	3.61	3.15	3.26	3.32	3.27	2.71
Gross margin (\$)	-	-	2.57	3.25	3.46	3.45	2.07	2.47	2.51
Labour charges (\$)	-	-	1.20	1.19	1.71	1.57	1.15	1.08	1.75
Contribution to overhead (\$)	-	-	1.37	2.06	1.75	1.88	.92	1.39	.76
Dairy investment/cow (\$)	-	-	942	1056	1087	975	717	776	789
Contribution to overhead as % of dairy investment	-	-	13.2	19.0	15.5	20.2	12.1	17.6	8.9
Average total farm investment (\$)	27,865	37,044	59,646	75,114	99,343	102,171	97,037	95,700	57,708
Average net farm income (\$)	3,196	5,656	5,329	8,763	14,524	14,278	8,019	7,832	4,368

^a. Sources: Nova Scotia Department of Agriculture & Marketing; Ministère de l'Agriculture et de la Colonization Québec.
 Ontario Department of Agriculture and Food; Saskatchewan Department of Agriculture; Alberta Department of Agriculture; Canada Department of Agriculture.

^b. Not exclusively fluid milk farms.

tended to raise milk production costs and reduce average net returns. Many competitive dairymen have reduced their average fixed costs by enlarging their size of enterprise. Data on the relation between output and average production costs is available for Ontario. (Unlike the cost data presented in Table I.12, these estimates include a standard charge of 5 per cent on both equity and borrowed capital, but exclude any other return to the operator -- i.e., the cost of his labour and management is not included.) These data, presented in Table I.13, indicate that the average cost per hundredweight declines sharply up to 300,000 but only modestly beyond this level. These data indicate that the minimum size for a competitive dairy enterprise is 25 to 30 cows with yields of close to 10,000 pounds. Smaller enterprises can be expected to have significantly higher costs. In 1966 there were less than 3,000 fluid shippers who shipped less than 96,000 pounds (located mostly in Quebec and the Maritimes) but there were probably another 5,000 in the 96,000 to 192,000 class, and both these groups would have had somewhat higher costs and lower net incomes than the average fluid shippers in the farm account samples. As production costs and technological improvements raise the economic minimum size of fluid milk enterprise, such shippers will find it increasingly difficult to compete. However, as a class they are not considered to have had serious income problems, and their adjustment out of the industry, or into larger sized operations, is facilitated by the opportunity to sell their quota rights or to a more limited extent by acquisition of additional quota.

(b) Manufacturing milk -- major enterprise. Based on the Canada Department of Agriculture survey and unpublished Canadian Dairy Commission reports we estimate that in 1966 there were about 27,000 manufacturing milk and cream shippers who derived at least three-quarters of their farm cash income from sale of dairy products. Table I.14 shows the geographic distribution of these shippers by herd size. Predominantly they were located in Quebec and Ontario, and had herds of

Table I.13. Estimated Average Total Costs of Milk
by Sales per Shipper, Fluid Milk Farms, Ontario

Specialized Fluid Milk Farms, 1966^a.

<u>Milk shipment/farm</u> (lbs.)	<u>No. of farms</u>	<u>Cost per 100 pounds milk</u> (\$)
96,000 - 191,999	15	5.80
192,000 - 239,999	20	5.06
240,000 - 287,999	20	4.92
288,000 - 335,999	15	4.85
336,000 (mean: & over 508,000)	33	4.77

D.H.I.A. Fluid Milk Farms, 1963-64^b.

<u>Milk sold & home use/farm</u> (lbs.)	<u>No. of farms</u>	<u>Cost per 100 pounds milk</u> (\$)
Under 175,100 (mean: 149,000)	78	4.01
175,100 - 225,000	130	3.73
225,100 - 275,000	162	3.64
275,100 - 325,000	90	3.36
325,100 - 425,000	122	3.33
425,000 (mean: & over 525,000)	83	3.26

^aSource: Unpublished study of dairy farms in Ontario by Raymond Cloutier, Department of Agricultural Economics, University of Guelph.

^bSource: Significant Tables from 1180 Dairy Cost Records, Ontario D.H.I.A., 1963-64, Ontario Department of Agriculture and Food, 1966.

Table I.14. Estimated Manufacturing Milk & Cream Shippers
Who Obtained More than Three-quarters of Farm Cash Sales from Dairy Products
by Region, Canada, 1966^a.

<u>Region</u>	<u>1-7 Cows</u>	<u>8-17 Cows</u>	<u>18 Cows or More</u>	<u>Total</u>
Maritimes	482	423	116	1,021
Quebec	1,334	6,267	5,734	13,335
Ontario	730	3,104	5,295	9,129
Prairies	1,647	1,468	627	3,742
British Columbia	50	50	86	186
CANADA	4,243	11,312	11,858	27,413

^aSource: Estimated from unpublished Canadian Dairy Commission data and from W.J. White and V.A. Heighton, op. cit.

eight or more cows. In addition there were another 30,000 shippers who derived at least half their farm income from this source, which together with livestock income from the dairy herd would make dairying a major enterprise on their farms. The latter shippers would also have had important secondary enterprises, typically hogs or beef cattle. Their dairy enterprises were on average somewhat smaller than that of the first group, but like that group, four-fifths of them were located in Quebec and Ontario. Production cost data from these provinces is provided in Table I.15. Because manufacturing milk and cream shippers have a wider range of herd size and production efficiency than do fluid shippers, the samples on which these costs were based were representative of a smaller segment of the population than were the production costs of fluid shippers. Specifically, these samples are more representative of herds of 18-32 cows than of the smaller size classes. Our estimates indicate that there were about 20,000 farms in this class in Ontario and Quebec in 1966.

Information on production costs for Ontario indicated that direct costs per 100 pounds of milk were not substantially below those for fluid milk farms, and though the revenue from dairy livestock sales partially offset lower prices (inclusive of all government subsidies) for manufacturing milk, net returns to overhead were considerably lower than on the fluid milk farms. Investment in dairying per cow was lower, as would be expected, and milk yields also were below the levels achieved by fluid shippers. In terms of total investment these farms were smaller than the fluid milk farms and this combined with the lower net return per dollar invested resulted in lower net farm incomes. In 1967, but not in 1966, the dairy enterprise on these farms was competitive with alternative enterprises. Moreover, account data from the top 20 per cent of these farms show that manufacturing milk enterprises can achieve returns at least as good as the average for fluid shippers. We therefore infer that part of the difference in

Table I.15. Costs and Returns on Manufacturing Milk Farms in Ontario and Quebec^a.

	Ontario				Quebec, 1966 ^b .		
	Total Sample		Best 20%		Area I	Area II	Total
	1966	1967	1966	1967			
Number of farms	166	108	34	22	269	52	321
Cows per farm	24.5	25.1	25.8	24.7	23	20	23
Milk sold per cow (lbs.)	8614	8641	9920	9663	7111	5973	6925
							8029
<u>Income per cwt. sold</u>							
Milk (\$)	3.96	4.43	3.96	4.45	4.05	3.70	4.00
Livestock credit (\$)	1.67	1.50	1.55	1.78	.97	1.00	.98
Total (\$)	5.63	5.93	5.51	6.23	5.02	4.70	4.98
							5.11
<u>Expenses & net returns per cwt. sold</u>							
Feed & other direct (\$)	3.51	3.17	2.72	2.93	-	-	-
Gross margin (\$)	2.12	2.76	2.79	2.30	-	-	-
Labour charges (\$)	1.11	1.13	1.02	1.15	-	-	-
Contribution to overhead (\$)	1.01	1.63	1.77	2.15	-	-	-
							- 27 -
Dairy investment/cow (\$)	827	856	806	883	-	-	-
Contribution to overhead as % of dairy investment (%)	10.5	16.5	21.8	23.5	-	-	-
Average total farm investment (\$)	44,713	47,088	48,810	44,204	27,218	24,350	26,751
Average net farm income (\$)	3,994	4,744	8,098	7,460	3,978	2,823	3,791
							6,449

a. Sources: See Table I.12.

b. Area I: area along St. Lawrence river between Quebec City and Montreal, and south and west of Quebec City.
Area II: area along St. Lawrence river east of Quebec City and the Lake St. John and Abitibi regions in Northern Quebec.

performance between fluid and manufacturing milk enterprises is ascribable to management, though higher average prices for milk to fluid shippers was also important.

The Quebec data do not provide the same detail of production costs, but do permit several useful comparisons (Table I.15). As in Ontario, investment, production performance, and gross returns per 100 pounds milk were lower on manufacturing milk than on fluid milk farms, and as a consequence net farm income on manufacturing milk farms was appreciably below that typically achieved on fluid farms. However, the best of these farms had incomes appreciably above the fluid farm average. Relative to Ontario, the Quebec manufacturing milk farms had poorer yields per cow and lower gross returns per 100 pounds milk, but their average net farm income was lower only in Eastern and Northern Quebec. Lower land values and probably lower labour costs account for the relatively small income differences. Significantly, the Eastern and Northern region had the lowest yields of any farm account sample of dairy farms examined. These are areas where the incidence of rural poverty is relatively high.

The relation between milk output and average production costs is examined in Table I.16 for the years 1965, 1966 and 1967 for 95 Ontario farms. (As in the data in Table I.13, a standard return of 5 per cent on equity capital in 1965 and 1966, and of 6 per cent in 1967, was included, but no charge was imputed for operator labour or management.) These data indicate that costs per 100 pounds fall quite sharply as output increases to about 150,000 pounds, tend to be still lower up to 250,000 pounds, but do not decline beyond that level. Much the same relation was found in a large sample of D.H.I.A. farms (Table I.16).

Table I.16. Estimated Average Total Cost of Milk
by Sales per Shipper, Manufacturing Milk Farms, Ontario^a.

Specialized Manufacturing Milk Farms, 1965-67

<u>Milk shipment/farm</u> (lbs.)	<u>No. of farms</u>			<u>Cost per 100 pounds milk</u>		
	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>
					(\$)	
48,000 - 143,999	24	10	12	4.33	4.42	5.01
144,000 - 191,999	22	13	19	3.78	3.28	4.23
192,000 - 239,999	19	24	23	3.42	3.38	4.29
240,000 - 287,999	15	19	13	2.89	3.03	3.82
288,000 (mean: & over 354,000)	16	29	28	3.07	3.45	3.86

D.H.I.A. Manufacturing Milk Farms, 1963-64

<u>Milk sold & home use/farm</u> (lbs.)	<u>No. of farms</u>		<u>Cost per 100 pounds milk</u>	
			(\$)	
Under 125,000 (mean: 107,000)	35		3.89	
125,000 - 174,900	98		3.46	
175,000 - 224,900	113		3.35	
225,000 - 299,900	132		3.23	
300,000 (mean: & over 355,000)	61		3.22	

^a. Sources: see Table I.13.

It is clear that under current Ontario conditions, manufacturing milk shippers with herds of over 25 cows or output of 250,000 pounds of milk who depend on dairying as a major source of cash receipts are earning adequate incomes, and further that those with 18-25 cows or output of 150,000 to 250,000 pounds are earning competitive returns. Those shipping less than 150,000 pounds can expect resource returns below returns typical from other well-managed livestock and crop enterprises. The latter farms (roughly equivalent to herds of less than 18 cows where the enterprise provided over half the total cash receipts) numbered about 35,000 in 1966 and at least two-thirds of them were located in the two central provinces. Available information suggests that many of these farms were situated in areas affording very limited alternative opportunities in agriculture or in off-farm employment.

(c) Manufacturing milk and cream with other major enterprises. Much of the manufactured milk and cream is produced on farms where the enterprises other than dairying provide an important proportion of total income. The great majority of dairy producers have such farms. Table I.17 shows the distribution of these shippers who obtained less than three-quarters of their cash receipts from dairy products by herd size and region in 1966. In that year an estimated 138,000

Table I.17. Estimated Manufacturing Milk and Cream Shippers Who Obtained Less than Three-Quarters of Farm Cash Sales from Dairy Products by Region, Canada, 1966^a.

<u>Region</u>	<u>1-7 Cows</u>	<u>8-17 Cows</u>	<u>18 Cows or More</u>	<u>Total</u>
Maritimes	5,617	3,109	320	9,046
Quebec	7,734	21,471	10,802	40,007
Ontario	8,034	12,963	6,390	27,387
Prairies	42,772	16,625	1,594	60,991
British Columbia	527	145	29	701
CANADA	64,684	54,313	19,135	138,132

^a Source: see Table I.14.

shippers derived less than 75 per cent of their income from milk and cream. Not surprisingly, most of these farmers had small dairy enterprises of less than 18 cows, and these were heavily concentrated in the Prairie provinces. Moreover, 105,000 of these 138,000 farms derived less than one-half their income from milk or cream, and of these 57,000 were in the Prairies.* Cream shippers characteristically operate such non-specialized dairy enterprises, a fact which accounts for the noted geographic distribution. The need for a complementary livestock enterprise to make economic use of skim milk tends automatically to make these mixed farms.

* Project estimate based on Canada Department of Agriculture survey and Canadian Dairy Commission data for 1966.

Comments made about the costs and returns of specialized manufacturing milk enterprises apply also to the large non-specialized enterprise. For the remainder of this group, which has accounted for most dairy farms in Canada, cost data are even less available. Some aspects of these dairy enterprises are clear. Herds are usually very small and contribute to farm gross sales by using family labour, pasture and buildings which have little value in alternative uses; production is seasonal and yields are low, specialized dairy equipment is rarely used; in most areas, other farm enterprises are the main source of income. Important exceptions to the last generalization include large parts of Quebec and marginal farming areas in the Maritimes, Ontario and the West. Another important aspect of those small dairy enterprises which ship cream is the value of the skim milk. This value varies considerably depending on labour costs, livestock prices, the total livestock diet of which skim milk forms a supplement, etc., but all available evidence indicates that its value on the farm is typically about \$0.60 per 100 pounds.* Its value if sold off the farm depends, of course, on the market price of manufacturing milk. In Saskatchewan where facilities for milk processing are minimal, its market value is about \$0.23, but in other provinces its value is at least \$0.63 per 100 pounds, and on average is close to \$0.90. The relatively high market value of skim milk has undoubtedly contributed to the decline in cream shipments.

Those producers who have small to medium dairy enterprises and do not have other enterprises to provide reasonable net farm incomes represent the hard core of the dairy income problem. Certainly if net incomes from dairying are to be improved on these farms, substantial infusions of capital and managerial skills will be required to enlarge the dairy enterprise to 25 or more cows and to improve production performance to 8,000 pounds per cow. This does not appear to be a

* Its value as feed is less where the skim milk is used seasonally as a supplement without regard to the diet balance.

feasible solution for the majority. Even since 1966, the year on which much of the analysis in this section has been based, large numbers have left the industry altogether. Information from Canadian Dairy Commission records reveals that, between 1966-67 and 1968-69, 25,000 producers in the under 50,000 pounds of milk class went out of production, and another 25,000 producers were cut off direct payments and most of them presumably are no longer shipping milk or cream. Those producers who currently have quotas of 12,000 to 50,000 pounds are even less dependent on dairy income than the shippers sampled in 1966. Over 50 per cent of these small producers derived less than one-quarter of their income from dairying, and 74 per cent derived one-half or less of their income from dairying. There are about 18,800 shippers in this output range who depend on dairying for more than 25 per cent of their total farm cash receipts, of whom about 2,300 were in the Maritimes, 7,700 were in Quebec, 3,000 in Ontario, and 5,800 in the Prairies (Table I.18). The same source indicates that one-tenth of all these quota holders had year-round off-farm employment and nearly 20 per cent had some off-farm employment.

Table I.18. Number of 12,000-50,000 Pounds Quota Holders in 1968-69
by Per Cent of Farm Cash Receipts from Dairy Products^a
by Region, Canada

<u>Region</u>	<u>Less than 26%</u>	<u>26-50%</u>	<u>51-70%</u>	<u>More than 70%</u>	<u>Total</u>
Maritimes	842	1,020	661	625	3,148
Quebec	1,788	2,164	2,258	3,200	9,410
Ontario	2,402	1,477	656	877	5,472
Prairies	16,317	3,516	1,118	1,142	22,093
British Columbia	77	52	24	39	192
CANADA	21,486	8,229	4,717	5,883	40,315

^a Source: Unpublished Canadian Dairy Commission data; distributions adjusted for about 3,000 shippers who did not provide income information.

(vii) Conclusions

The information on incomes of dairy farmers is very limited. The structure of the dairy sector is changing rapidly. Both these considerations require the use of careful judgement in assessing the extent of current income problems in the sector. The conclusions we have drawn, largely from the material presented, partly from an appreciation of the situation gained from the analysis and from discussions with others knowledgeable about dairying, can be summarized as follows.

1. Much of the primary dairy sector is characterized by poor management, archaic technology, and small scale enterprises, but the majority of producers with such enterprises do not depend on them as a major source of income, and the dairy enterprise makes use of pasture, labour and building resources which have low opportunity costs. However, in much of Quebec and in marginal farming areas in other provinces, low output dairy enterprises make a significant contribution to the relatively low total incomes of farm families. Moreover, on most enterprises shipping between 50,000 and 150,000 pounds milk equivalent, production cannot be based on otherwise underutilized resources, and production costs are high. The demands of the medium to large dairy enterprise limit the ability of the operator to take off-farm employment.

2. The rate of structural change in the sector has been extremely high, and we do not expect that this rate of change will abate. In our estimation there are currently no more than 15,000 producers shipping less than 50,000 pounds who are experiencing serious income problems.* In addition, there may be up to 25,000 larger shippers who are facing income problems, but generally less severe problems. Among cream shippers there is a marked trend to convert to shipping whole milk or quit dairying, and we expect that cream shipping will virtually disappear during the 1970's, with the possible exception of Saskatchewan.

* There are approximately 19,000 shippers in this class in the current dairy year who have depended on sales of milk and cream for more than 25 per cent of their farm cash income. Allowing for off-farm employment earnings and other sources of family income (including pensions and income received by other members of the farm family), the estimate of 15,000 producers in this class in poverty was considered a reasonable upper limit.

3. Milk production costs are not being covered by market prices for manufacturing milk and cream, except on those enterprises small enough to use surplus farm resources, and on some enterprises with efficient managers which are large enough to fully utilize modern production techniques. In other words, most dairy producers depend on federal government direct subsidies for their net income from dairying. Many producers receiving very low net returns prior to the direct payments programme continued in dairying either because they were unaware of the poor economic performance of the enterprise, or because they were prepared to accept low returns on their labour and lower than market returns on their equity, the latter probably in anticipation of capital gains. Fluid milk producers as a class do not have serious income problems, and do not stand in need of federal government assistance.

II. PRICE POLICIES AND THEIR IMPACT ON PRIMARY PRODUCERS

(i) A review of federal pricing policies in the post-war period.

The institutional framework in which prices for dairy products has been determined is complex. Throughout the post-war period, and throughout most of the historical development of the Canadian dairy industry, import licensing has virtually prevented entry of all but specialty dairy products and requirements to meet temporary market shortages. Indeed, minimization of imports of commodities which were also produced in Canada appears to have been a tenet of dairy policy. Within the protected domestic market the marginal price of dairy products has been supported by offers to purchase at specified price levels continuously since 1948. In addition, the federal government has enhanced prices to producers of milk for various types of markets through deficiency, direct, and supplementary payments, government purchases, and by export subsidies as circumstances appeared to warrant such assistance. Provincial governments in turn have controlled or enabled the control of fluid milk prices at levels higher than for other dairy products, and have also engaged in occasional subsidization of manufacturing milk.

Thus, the pricing of milk may synoptically be described as follows: within provinces the price of milk for fluid use has been set at a higher level than for other uses; milk which could not be absorbed into the fluid market has been sold for manufacturing purposes, but the minimum price of manufacturing milk has been determined by federal price supports, notably for butter; the price of farm separated cream has been determined in most years by the butter support price. In addition to market returns, producers have received many different ad hoc subsidies.

Our review of the development of federal policies is divided into three parts: the period up to 1958; the dairy programmes of the Agricultural Stabilization Board, 1958-65; and the emergence of the Canadian Dairy Commission and its policy, 1966 to date.

Dairy Policies up to 1958

During World War II direct subsidies to dairy producers were used to sustain milk supplies while retail price controls were in effect. With the removal of both price ceilings and producer subsidies by 1947, substantial increases in retail and farm prices occurred. However, the emergence of better alternatives to dairying resulted in a decline in total production. Concern over butter shortages resulted in the introduction of a support price for butter in 1948 intended to stimulate summer production. But in December, 1948, the Supreme Court declared the prohibition of the manufacture and sale of margarine to be unconstitutional, and by the following year the introduction of margarine had greatly reduced butter consumption. The purpose of the support programme was then reversed to that of producer price stabilization, and its administration shifted from the wartime Dairy Products Board to the Agricultural Prices Support Board. Accumulation of butter stocks induced the Board to reduce its support price from 58¢ to 53¢ in 1950. This reduction proved to stimulate consumption and encourage reduced production enough to require significant importation of butter, and in May 1951 the Board reinstated the 58¢ support level, initially for a two-year period. (This support price was maintained until 1958.) At the same time cheese price supports were introduced in the face of continuing decline in production and the termination of government export contracts with the U.K.

The loss of export markets for cheese coincided with a general deterioration of world markets following the end of the Korean conflict, the recovery

of European agricultural capacity, and European dollar shortages. Milk was diverted from cheese to other uses, particularly butter production. Though consumption of butter increased, the expansion of production through to 1955 was rapid and stocks built up to 100 million pounds by January, 1956. Stocks of other dairy products were high during these years, and, with the exception of fluid milk, the farm prices declined. However, the marginal price was set by butter support prices, and it was to this market that milk in excess of other requirements was directed. (The cheese support price was not high enough to be effective and the programme was discontinued in 1953.) These problems abated in 1956 and 1957 as total production stabilized: stocks began to decline and farm prices of milk (but not butterfat) made significant gains.

Dairy policy throughout this early post-war period can be characterized as modest in cost, short-run in outlook, and based on 'rule of thumb' measures. It was to a large extent influenced by the policy philosophy developed during the War, which emphasized immediate problems and relied heavily on temporary measures to adjust domestic market imbalances and ensure fulfillment of export contracts. The same ad hoc approach to problems in the post-war years worked less effectively, in part because de-control of prices and wage rates resulted in much greater market adjustment possibilities. Support of butter prices evened out seasonal fluctuations, thus stimulating summer production and winter consumption. Cream shippers and low output manufacturing milk shippers, whose production was concentrated in the summer months, received substantially higher prices. The incentives for year round production associated with larger output dairying were reduced. Whether total consumption of butter was lowered by the programme is less clear. In the short-run annual consumption might well have been higher in the absence of price supports, but then in the long run margarine would have substituted more readily as high winter prices for butter induced more consumers to try the cheaper spread. What is clear is that the use of support programmes to reduce

seasonal price fluctuations to producers, had the effect of encouraging many marginal producers and thus retarding structural adjustment in the dairy industry.

Dairy Policies of the Agricultural Stabilization Board, 1958-65

The decline in real prices of agricultural products and in net income from farming which had occurred since 1951 made agricultural policy a major issue in the federal election of 1957. The Diefenbaker government, elected with substantial rural support, introduced a number of programmes intended to improve farm incomes. Of these the Agricultural Stabilization Act, proclaimed early in 1958, had the largest and most direct impact on the dairy industry. Under this Act both butter and cheese were named as commodities requiring mandatory price support at not less than 80 per cent of the preceding ten-year average. In fact, the support price of butter was raised immediately to 64¢ or 107 per cent of the average in the previous decade, and the support level of cheese was raised to 34¢ or close to 10 per cent above the base price. The support price of skim milk powder, which had led to surpluses, was reduced.

Predictably, the effects of these higher dairy product prices in 1958 were higher levels of production, slightly reduced consumption, increased stock levels, and very much higher support programme costs. Expanded exports of cheese enabled the federal government to dispose of its acquisitions of that product within the fiscal year and total stocks declined, but butter and skim milk powder stocks increased very substantially. In the following year cheese support prices were lowered. Support prices for skim milk powder were cut again, and this combined with disposal of skim milk powder abroad reduced the stocks of that product by more than three-quarters. A 25¢ per 100 pounds direct subsidy for all manufacturing milk (including cheese milk) shippers was established in compensation for these cuts in support levels. Milk production increased only slightly and the cost of support programmes declined by about 14 per cent. Butter stocks, however, continued to accumulate despite export disposal of over 10 million pounds.

By January 1960, butter stocks amounted to one-third of annual domestic disappearance, yet the Board maintained its support programme for butter unaltered. Indeed it was not until May 1962, that any attempt was made to reverse the mounting surpluses of butter. By this time stocks amounted to about 200 million pounds or two-thirds of annual domestic consumption, much of it in the form of butter oil.

With butter established by policy as the balance wheel of the dairy industry, programme changes to dispose of butter stocks were accompanied by changes in supports for other dairy products. In May, 1962, the Agricultural Stabilization Board reduced the retail price of butter by making a compensatory payment of 12¢ per pound to manufacturers while maintaining an effective producer support level of 64¢. The support price for cheddar cheese was raised modestly, the manufacturing milk subsidy was continued and the support price for skim milk powder was cut once again. These changes in support programmes served to greatly reduce butter stocks via domestic consumption, and to encourage diversion of milk to production of cheese, a product in which Canadian comparative advantage is relatively high and which had had a steadily expanding domestic market and a much improved export market. The change in the skim milk powder support level had little real impact since the Board had not purchased any skim milk powder since 1959.

In brief, the dairy policy pursued by the Diefenbaker administration was to use much the same means of assisting the industry as that of preceding post-war administrations but at a higher level of support. Little attempt was made to facilitate adjustment within industry. While the constant support price for butter reduced fluctuations in the price of milk at the margin, dairy programmes were subject to change from year to year and a long-run price policy was not established. Such a price climate would tend to encourage small output producers with low investment in dairy production and discourage changes in technology requiring substantial capital investments. Undoubtedly the policy reduced the

disparity in returns between fluid and other producers, but not the disparity in levels of production technology.

The succeeding Liberal government made few basic changes in dairy policy in its first two years in office. In May 1963, the butter support level was maintained but by a subsidy payment to producers at the same rate per pound as had been paid to manufacturers, and excluding any butter production from milk produced by fluid milk shippers. The manufacturing milk subsidy was replaced by a 30¢ per 100 pounds subsidy to cheese milk shippers only. The skim milk powder support price was raised but since commercial prices remained above the new level this did not lead to acquisition by the Board. In the following year, with butter stocks greatly diminished, the wholesale, and hence retail, price of butter was increased, and the direct payment to cheese milk shippers was replaced by an equivalent subsidy confined to first grade cheddar only.

In 1965, a move to a new dairy policy was announced. The intent of this policy was to raise the price of milk and cream for manufacturing use to a national average of \$3.50 per 100 pounds milk equivalent. (In 1964, that average was below \$3.00.) A deficiency payment was to be used to raise the average price to \$3.30. The balance was made up by a supplementary payment per 100 pounds sales at the following rates: 26¢ per 100 pounds for the first 48,000 pounds; 20¢ for the next 48,000 pounds; and 10¢ for sales over 96,000 pounds. Shippers with sales of less than 10,000 pounds were ineligible for this payment. This feature of the 1965 dairy programmes presages a significant change in dairy policy. For the first time recognition was explicitly given to structural problems within the dairy sector. Specifically, the programme identified a group of producers as submarginal to dairying and implied that the assistance required by other producers was inversely proportional to output.

In other respects the 1965 dairy programmes were "business as usual." Continuing reductions in butter stocks led the Agricultural Stabilization Board to raise its buying and selling price of butter and reduce its compensatory payments to shippers. The level of support for skim milk powder was raised but only to provide a floor below the current market price. Similarly, the cheese price support level was raised to 35¢ per pound, a price below the prevailing market rate. Cheese exports to Great Britain had been subsidized to assist sales to the lower priced British market and this subsidy was increased to 4¢ per pound.*

The Canadian Dairy Commission and Its Policies

The Canadian Dairy Commission was not established until late in 1966 and did not assume its full responsibilities until April 1, 1967, but the basic format of the new dairy policies was announced and coupled with a statement of intent to create the Commission in March, 1966. Indeed, much of the new approach was foreshadowed by the 1965-66 programmes. Expressing concern for the "continued deterioration in the economic position of the dairy farmer," the government in the spring of 1966 introduced a system of higher support of market prices, direct payments and export subsidization designed to raise prices of cream and milk for manufacturing to \$4.00 per 100 pounds of milk equivalent. The average market price of these products was to be increased to \$3.25 by raising the support price of butter to 59¢ (later it was raised to 61¢) and by supporting skim milk powder at 18¢, and the balance was to be made up by direct payments of \$0.75 per 100 pounds of milk. Fluid producers were to receive direct payments on shipments in excess of 120 per cent of their sales to the fluid market. With this exception, no limits on sales eligible for subsidy were imposed. A fund corresponding to 10¢ per 100 pounds of milk eligible for direct assistance was provided to finance export disposal, and the unused balance of these funds was to be distributed to producers in proportion

* The efforts of the Ontario Cheese Producers Marketing Board to raise producer returns through discriminatory pricing is discussed under provincial policies.

to their sales of eligible milk. Export subsidies were offered on a number of products including skim milk powder, casein, evaporated and condensed milk, and cheddar cheese.

In effect this policy sought to substantially increase returns to dairy producers partly by higher consumer prices, but mainly through direct government payments. Farm prices of milk and cream for manufacturing rose slightly, while that of butterfat, for which the former direct subsidy to producers had been dropped, declined, and the target national average of \$3.25 was not achieved. But the direct payments added close to \$90 million to dairy farmers' incomes over the supplementary payments they had received in the 1965-55 year, and by the same token the cost of federal assistance to the industry rose to well in excess of \$100 million.

The immediate impact of these higher returns on total sales in 1966-67 was modest, and the imposition of quotas for direct payments in the following dairy year removed the incentives for major supply expansion.* While consumption of butter predictably declined, there was little market incentive for expanded production and stocks declined. Skim milk powder, however, was priced too high and despite subsidized exports, stocks accumulated.

Under the Act which established it, the Canadian Dairy Commission was authorized to engage in all facets of federal dairy price policies which until that time had been undertaken by the Agricultural Stabilization Board, acting largely under Orders in Council, and the Agricultural Products Board. The complexity alone of dairy programmes required the creation of an agency with exclusive responsibility for their administration. But the Commission was intended also to make policy recommendations to the government. Public statements by the Minister of Agriculture on the Commission, and the simultaneous appointment of a Consulta-

* Federal dairy quotas entitle the shipper of manufacturing milk or cream to receive direct payments only on shipments up to his quota volume, but do not limit his shipments or determine the market price he receives for his milk or cream. For a discussion of the supply response to recent dairy programmes, see Appendix II.A.

tive Committee to the Commission made up primarily of dairy farmers or representatives of dairy farmers, make this clear. Indeed, the Commission was ostensibly created in response to requests by the dairy industry for a national agency to plan and implement federal policy and co-ordinate provincial policies.

In April, 1967, the Commission made a number of important changes to the developing new dairy policy. For the 1967-68 dairy year assistance to the dairy sector was increased still further, but the basis of eligibility for direct payments was restricted. The target national average price for dairy products other than fluid milk was set at \$4.75 per 100 pounds milk equivalent. To this end, support prices of butter, skim milk powder and cheese were raised to 63¢, 20¢ and 38¢, respectively, and the direct payment was raised to \$1.10 per 100 pounds milk equivalent, with 11¢ per 100 pounds of eligible milk set aside for export subsidization. However, with a number of minor exceptions, direct payments were made only to manufacturing milk and cream shippers and only for sales up to the quantities they had marketed in 1966-67. Producers who in the latter year had sold less than 50,000 pounds of milk or 1,750 pounds of butterfat were given an open quota up to these amounts, and were warned the Commission proposed to restrict eligibility for payments in 1968-69 to those shipping 50,000 pounds and over in 1967-68. The total amount of quota was fixed at 99,500,000 hundredweights, or approximately the volume of manufacturing milk and cream deliveries in 1966-67.

Establishment of subsidy eligibility quotas led to considerable concern and criticism both on account of producers who had less than capacity sales in the preceding year and on the part of larger producers, fluid shippers and those building to over 300,000 pounds sales, who found themselves cut off or with limited eligibility.* The Commission contended that its objective was to encourage the development of economic sized production units, and it implied also that direct assistance for the largest producers should be limited to the milk equivalent of 300,000 pounds

* British Columbia pool shippers were permitted to continue to receive direct payments on production above 120 per cent of their fluid sales.

of sales. The Commission further made it clear that quotas were not negotiable. In reserving the right to reallocate quotas it would give preference to existing quota holders, and entrants to the programme would not be permitted to start with less than 100,000 pounds of quota.

For the target average return of \$4.75 per 100 pounds to be realized, market returns would have had to be at least \$3.54 and the full sum of the export assistance fund would have had to be distributed to producers, making their total direct payments \$1.21. In fact market returns appear to have fallen short of this level and clearly funds have been used for export subsidies. Nevertheless, market prices did rise, probably by over 20¢ on the average or an increase of about 7 per cent, and recipients of direct payments did receive 35¢ per 100 pounds more than in 1966-67.

Thus largely through support programmes but also through supply adjustment, producer prices for manufacturing milk have risen by 68¢ per 100 pounds from 1962 to 1967. Most of the increase has occurred since 1964: in that year the average for Canada was \$2.77, in 1965, 1966 and 1967 it rose successively to \$2.94, \$3.09 and \$3.32.

Stock problems have arisen in the past year; in the case of skim milk powder because of the increase in support levels and depressed world market prices, and in the case of cheddar cheese mainly on account of British and New Zealand currency devaluation and resultant export difficulties.

In announcing the programme details for the 1968-69 dairy year, the Commission retreated from its earlier proposal to cut off direct payments to producers shipping less than 50,000 pounds of milk or cream equivalent, presumably in response to political pressures preceding anticipated elections. Instead, eligibility quotas were restricted to those whose sales in 1967-68 were at least 12,000 pounds of milk or 420 pounds of butterfat. The total quota volume was established at 98,500,000 hundredweights. Reallocation of quotas would be used to favour growth of small to medium output shippers who exceeded their quotas

in the past year, up to a maximum of 300,000 pounds of milk or cream equivalent. Moreover, the Commission made clear that those producing up to 50,000 pounds of milk or cream equivalent in 1967-68 would have to reapply for quota and show that dairy receipts were a significant part of their total earnings. Finally, consideration would not be given to applications for subsidy quotas by new entrants, excepting those who have sales of 100,000 pounds and over.

Introduction of the minimum sales level for eligibility eliminated an estimated 25,000 producers.* Of the 1967-68 quota holders who would have qualified, about 21,000 went out of dairy production, and an additional 8,000 in the 12,000 to 50,000 pounds class failed to apply for participation in the programme. Consequently, the Commission did not have to apply its criteria of eligibility to the 12,000 to 50,000 pounds class as stringently as it had anticipated. In total about 37,000 quota holders who had had sales in excess of their quotas in 1967-68 were given additional quota.

The rate of direct payments was raised from \$1.10 to \$1.16 per 100 pounds of milk, but (in deference to the fact that cream shippers have not contributed to skim milk powder surpluses) from 31.42¢ to 36.42¢ per pound butterfat for those shipping cream. The funds set aside for export subsidization amount to 15¢ per 100 pounds of eligible milk, and 1¢ per pound of eligible butterfat. Support prices of butter and skim milk powder have been kept at the 1967-68 levels of 63¢ and 20¢, respectively, but the cheese support price was raised to 47¢, a level equivalent to the combined butter and skim milk powder support price, during May through October. The intent was to encourage diversion of milk into cheese during the months of peak milk production and the most favourable period for quality cheddar production.

The 1968-69 dairy programmes do not differ significantly from those of the preceding year, and this consistency has contributed to the impression

*These shippers received compensation equivalent to their 1967-68 subsidy payments.

that the Commission is developing a long-run dairy policy. The details of such a policy, if already formulated, are not publicly known. In fact, the Commission appears to be "feeling its way". A detailed assessment of the Commission's policies and role follows.

An Assessment of Recent Federal Policy

It is convenient to assess the recent policy programmes and the role of the Canadian Dairy Commission under the following headings:

- (a) Support for market prices
- (b) Direct payments to producers
- (c) The total costs of dairy programmes
- (d) Policy planning

(a) Support for market prices

Domestic market prices for dairy products, and hence for milk and cream at the farm level, have been supported by import restrictions, by offer to purchase, and by export subsidies. In the absence of government acquisition of a dairy product its domestic price typically would be above its world market price and that difference could be used as a measure of the degree of protection afforded by restrictions on imports. In fact prices of dairy products throughout much of the post-war period have been raised still higher by government purchasing. If the objective of such acquisitions is solely to stabilize fluctuations in supply, then the accumulated stocks can be sold on domestic markets after storage over the period of excess supply. But if, as typically has been the case of dairy support programmes, the purpose is to raise producer prices, government acquisitions of the commodity must be disposed of on export markets at a price much lower than its acquisition cost.

While price support by import restriction is long established in the Canadian dairy industry and generally accepted, offer to purchase programmes have

provoked numerous criticisms. Probably the most common objection arises because of the "visibility" of surplus stocks. Fears of extremely high accumulation of stocks such as occurred in the United States, the paradox of domestic surplus in the face of food deficits in poor countries, the apparent benefits to warehouse owners, quality deterioration of the stored product, and losses incurred in its disposal abroad, have made such programmes the object of much adverse publicity. By raising market prices, offer to purchase programmes raise consumer prices. All producers of the commodity benefit from higher prices, thus encouraging the least efficient producers, and providing most benefit to the largest output producers who might be expected to least need any assistance. In the case of the dairy industry such price supports in the post-war period have been accompanied by some assurance of continuity, and this together with the use of the butter market as the means of supporting prices throughout the industry has **retarded the rate of** rationalization and helped to perpetuate a large number of small producers, particularly cream shippers. Maintenance of such production units has been encouraged also by seasonally constant support levels which favour low investment, summer production.

The cost of offer to purchase programmes reached a peak under the butter support programmes of the Diefenbaker administration and in the new dairy policy this type of measure has been overshadowed by direct payments. There is some indication that the Commission intends to support market prices only at levels which will equate supply with domestic demand and requirements for cheddar exports, which would reduce the role of offer to purchase and export subsidization programmes* to that of short-run stabilization:

"..... producers generally have recognized and accepted the principle that the production of manufacturing milk and cream must, in total,

*The export subsidization programmes are essentially similar to the offer to purchase measures (excepting the absence of surpluses as stock accumulation). The export subsidy programmes are discussed at the end of this sub-section.

be kept reasonably within the limits of the quantities which the market will take at a given price. The acceptance of this point of principle is, in our view, an important step in the long-term planning of the industry." (S.C. Barry, Chairman, Canadian Dairy Commission)

However, the number of dairy commodity prices which have been supported and the cost of this support have increased in recent years.

To measure the changing cost and incidence of cost of dairy price support programmes, the wholesale price of butter and cheese at Montreal were compared with the equivalent prices of New Zealand products at London, England. The difference in these prices is a relevant yardstick of the measure of protection afforded Canadian dairy producers, and multiplied by the level of domestic disappearance it is a measure (albeit an incomplete measure) of the cost of this protection to Canadian consumers.*

Skim milk powder prices also have been supported in recent years. However, except in such years Canadian prices have not been appreciably above world market levels. The consumer has borne the cost of such support through higher retail prices, but primarily of products which use the powder as an ingredient rather than of skim milk powder itself. We estimate these costs to have been about \$6 million in 1967. The total costs of supporting skim milk powder prices are much higher: due to the product's rather limited commercial market for human consumption, surpluses must usually be disposed of for animal feed at much lower prices, or sold on concessional terms to low income nations.

Butter. As shown in Table II. 1 the cost to consumers of butter price support programmes in the post-war years has varied considerably, due both to changes in support levels and in international market prices. The total cost to consumers has been large in all years, but there has been a downward trend in support costs to consumers, particularly if allowance is made for depreciation in the value of

*See appendix II.B.

Table II.1 The Producer Protection and Consumer Cost of Dairy Price Supports, Butter, 1950-67.^a

Average Wholesale Prices:

Year	1st. grade, Montreal	New Zealand finest, London	Montreal price as % of London	Montreal price less London price multiplied by Canadian domestic disappearance
	¢ per lb.	¢ per lb.	%	\$ (millions)
1950	56.9	21.8	261	107.5
1951	62.6	23.0	224	102.9
1952	61.6	30.6	201	92.8
1953	60.0	37.1	162	70.2
1954	59.3	44.8	133	45.2
1955	58.9	44.4	133	46.1
1956	57.5	38.5	149	62.7
1957	59.5	35.2	169	81.8
1958	63.1	28.6	221	112.6
1959	63.6	41.1	155	71.2
1960	63.5	33.6	164	75.4
1961	63.0	33.5	188	88.7
1962	54.9 (62.9) ^b	40.2	137 (156) ^b	48.8
1963	50.8 (62.8)	44.0	115 (143)	24.6
1964	51.8 (63.1)	45.2	115 (140)	24.2
1965	54.3 (63.9)	44.9	121 (142)	34.3
1966	59.0 (62.0)	40.7	145 (152)	65.2
1967	62.5	40.0	156	77.5

a Source: Dairy Statistics, D.B.S. Cat. # 23-201, and data supplied by the Canada Department of Trade and Commerce.

b Based on support prices to producers. Other subsidies served to reduce wholesale and retail market prices between April, 1962 and March, 1965.

the dollar. In the past ten years the most striking changes are the reduction in consumer costs between 1962 and 1965 following the high offer to purchase prices maintained by the Agricultural Stabilization Board between 1958 and 1962, and the increase in consumer costs in the most recent years; from an average annual cost of over \$85 million in the years 1958 through 1961, the burden to consumers declined to about \$24 million in 1963 and 1964, and then rose to over \$75 million last year. In the same period total market returns to producers have varied less, and have been consistently at least 40 per cent higher than on the international market. However, the benefit to producers is much less than the consumer cost, because the opportunity costs of butter production are considerably higher than the returns which would prevail in the absence of any government assistance.

Cheese. Canada is far more competitive in the production of cheddar cheese than of butter, and this is reflected in the relatively low differentials between cheddar prices in Montreal and London (Table II.2). Moreover, the differential partly results from the distinctive quality of the Canadian over New Zealand cheddars which are compared, though so far as the Canadian market is concerned the premium would probably be about 2 to 4 cents per pound. With the exception of the past few months, offer to purchase prices since 1958 have not been high enough to raise market prices above levels set by import restrictions. The consumer cost of supporting cheddar cheese prices has been modest: we estimate those costs at close to \$10 million for 1967, a year in which the support price was relatively high.

Data on the treasury costs of support programmes are more readily available, although the published information requires careful interpretation. In many instances stocks of a commodity acquired by the government in one year were not disposed of until subsequent years. In accounting for the costs of a support programme in any given year we have charged to the support programme in that year all the net losses in disposing of any stocks acquired in that year, regardless of the time of disposal. This form of accounting

Table II.2 The Producer Protection & Consumer Cost of Dairy Price Supports, Cheddar Cheese, 1950-1967.^a

Average Wholesale Prices:			
Year	Coloured Montreal/ Belleville	New Zealand finest white, London	Montreal price as % of London
	¢/lb.	¢/lb.	%
1950	29.50	13.25	222.6
1951	37.75	13.05	289.3
1952	32.50	23.08	140.8
1953	31.38	25.05	125.3
1954	32.00	22.89	139.8
1955	31.25	24.19	129.2
1956	33.75	33.21	101.6
1957	35.38	23.35	151.5
1958	35.00	22.68	154.3
1959	36.38	34.89	104.3
1960	32.75	29.82	109.8
1961	33.38	30.20	110.5
1962	34.75	31.15	112.0
1963	36.63	31.17	117.5
1964	37.25	32.85	113.5
1965	40.13	34.77	115.4
1966	42.88	34.51	124.3
1967	45.25	34.16	132.5

a Source: see footnote Table II. 1.

provides a different and more appropriate assessment of the temporal incidence of support costs than the total net losses incurred in any particular year as reported by the Agricultural Stabilization Board. The treasury costs of support programmes were allocated among provinces in proportion to provincial production of the commodity in the support year, on the premise that benefits would be distributed among provinces in roughly these proportions. By these means changes in both the magnitude and the regional distribution of the treasury costs of price supports over time were examined.

Butter price support programmes. The Agricultural Stabilization Board losses on butter support programmes for the dairy years 1958-59 through 1965-66 are shown in Table II. 3. These costs have varied widely over the period. Under the high support levels of the earlier years the Board's losses on butter purchases rose to \$33 million and \$23 million in 1960-61 and 1961-62, and then declined under the amended support programme of subsequent years. (The total losses on the 1965-66 programme probably have amounted to more than the \$515 thousand shown, since the inventory value of butter acquired in that year was reported at over \$5 million as of March 1966.) However, the full cost of the support programme for butter in these latter years was much higher than the losses on butter purchased by the Board. These losses were reduced because the offer to purchase price was lowered and the Board acquired less butter, but the support price level was maintained by producer subsidies (which were equivalent to deficiency payments) and the total treasury costs of the programme rose to the highest levels on record. In effect, the change in the method of supporting butter prices transferred a considerable part of the cost of the programme from consumers to the federal treasury, without affecting the combined consumer and government support costs. The downward trend in the costs of the programme after 1962-63 is explained mainly by the reduction in the real support price which

Table II.3. Distribution of Treasury Costs of Butter Price Support Programmes By Province, 1953-59 to 1965-66.^a

	Canada	PEI	NS	NB	Que. \$ (thousands)	Ont.	Man.	Sask.	Alb.	BC
1958-59	5,271	96	74	132	2,025	1,444	427	470	548	53
1959-60	1,853	32	24	44	733	496	142	162	196	24
1960-61	32,943	550	378	738	12,551	8,730	2,576	2,399	3,914	590
1961-62	23,205	378	253	494	9,129	6,360	1,641	1,331	2,722	388
1962-63	3,223	52	32	62	1,306	926	230	243	308	63
Subsidy ^b	45,710	736	457	873	18,522	13,128	3,259	3,447	4,374	896
Total	45,933	788	489	935	19,828	14,054	3,489	3,690	4,682	959
1963-64	2,922	45	26	54	1,144	858	207	222	326	39
Subsidy ^c	38,472	592	339	712	15,066	11,295	2,720	2,924	4,293	519
Total	41,394	637	365	766	16,210	12,153	2,927	3,146	4,619	558
1964-65	3,014	50	26	55	1,147	948	200	213	336	38
Subsidy ^c	35,343	587	300	647	13,451	11,115	2,350	2,495	3,937	449
Total	38,357	637	326	702	14,598	12,063	2,550	2,708	4,273	487
1965-66	515	9	5	9	203	164	33	32	54	5
Subsidy ^c	25,388	437	234	427	10,028	7,891	1,610	1,534	2,704	264
Total	25,903	446	239	436	10,231	8,055	1,643	1,616	2,758	269

a Sources: Annual Reports of the Agricultural Stabilization Board and project estimates of provincial distribution.

b A 12¢ per pound of butter subsidy paid to manufacturers to permit lower retail prices and maintain producer price support at the 64¢ level.

c A subsidy per pound of butterfat paid to producers in order to maintain the support price at 64¢ progressively reduced as offer to purchase price was raised. Amounted to 14.5¢, 13.3¢, and 10.9¢, in 1963-64, 1964-65, and 1965-66 respectively.

contributed to a decline in butter production, and by the growth of domestic demand (due to population and per capita income growth) which permitted the Board to raise its purchase price and reduce the direct producer subsidy, without accumulating surpluses. Throughout the period 1958-59 to 1965-66 Ontario and Quebec have accounted for 65-70 per cent of butter production and have tended to increase their share over time. Thus approximately these proportions of federal expenditures on butter price supports have been spent on behalf of producers in these provinces. The Prairie provinces also accounted for a large proportion of treasury costs, but the combined share of these provinces declined from about 27 to 23 per cent.

Details of the costs of butter price supports in 1966-67 and 1967-68 were not available at the time of writing this report. Government purchases of butter amounted to 61.5 and 80.4 million pounds in the past two dairy years, and this increase with the concomitant rise in skim milk powder acquisitions was instrumental in raising the support price of cheddar in 1968-69 in order to divert milk into production of that commodity. However, the price of butter in recent years has been supported at close to a domestic demand-supply equilibrium level, and the main impact of the support has been to minimize seasonal price fluctuations by government absorption of storage costs.

Cheddar Cheese Price Support Programme. In comparison with the butter programmes, the treasury costs of supporting cheddar cheese have been low, mainly because the level of support has tended to be below the commercial market price (Table II. 4). Between 1958-59 and 1962-63 the Agricultural Stabilization Board resold the bulk or all of its purchases of cheddar within the year of purchase, and mostly in the United Kingdom market. From 1963-64 on the Board did not acquire any cheddar, but subsidized nearly all exports of the product. This procedure had the apparent advantage of avoiding competition between the Board and

Table II.4. Distribution of Treasury Costs of Cheddar Price Support Programme, by Province
1958-59 to 1965-66^a.

	Canada	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
	\$ (thousands)									
1958-59	724	7	-	7	192	494	5	1	13	6
1959-60	128	1	-	1	40	82	1	0	2	1
1960-61	315	3	-	2	115	185	1	1	1	3
1961-62	666	5	-	3	260	378	3	-	10	6
1962-63	972	7	-	4	370	564	5	-	14	8
1963-64	777	6	-	3	324	423	5	-	11	5
1964-65	705	8	-	3	294	379	5	-	11	5
1965-66	1,065	11	-	4	412	607	8	-	14	8

a Sources: Annual Reports of the Agricultural Stabilization Board and project estimates of provincial distribution.

commercial exporters in overseas markets, but the cost of subsidization did increase. Nearly all of the benefits (and costs) of these programmes were allocated to Ontario and Quebec, which accounted for over 90 per cent of cheddar production.

Cheddar price support cost details after 1965-66 were not known at the time of writing this report. The costs of subsidizing cheddar exports in 1966-67 were apparently about the same as in the preceding year, namely \$1.1 million, and are believed to have risen to nearly \$2 million in 1967-68 when the maximum export subsidy was increased from 4¢ to 6 $\frac{1}{2}$ ¢ per pound. But in 1968-69 higher production and a maximum export subsidy of 15 $\frac{1}{2}$ ¢ per pound should expand exports from 32 million pounds to about 40 million pounds and the total export subsidy to about \$6 million.

Other Price Support Programmes. After heavy purchasing of skim milk powder in its first two years of operation, on which it incurred losses in excess of \$11 million, the Agricultural Stabilization Board did not actively support the price of skim milk powder again until 1966-67. In the interim the Agricultural Products Board supported the price of this product by purchase and export at loss, and by subsidization of exports arranged by the commercial trade. This agency was also responsible for the export subsidization of minor dairy products, including evaporated and condensed milk, dry whole milk and dry casein. The total operating losses incurred by the Agricultural Products Board in supporting dairy products amounted to over \$10 million during the five year period 1962-63 to 1966-67, of which nearly \$7 million was attributable to the support year 1966-67.* In recent years the export subsidization programmes have predominantly used the procedure of advising the trade of maximum subsidies per unit which the Board is prepared to pay, and leaving it to the trade to make the

*The Agricultural Products Board is primarily engaged in price support activities but is also responsible for famine relief and other food aid programmes.

export arrangements and apply for the subsidy.

In 1963-64 and 1964-65, the price of dried casein or caseinates was subsidized at the rate of 10 cents per pound "for the benefit of producers of milk." This programme, administered by the Agricultural Stabilization Board, involved a treasury cost of almost \$4 million. Subsequently casein prices were supported by export subsidies administered by the Agricultural Products Board.

The total cost of export assistance programmes in 1967-68 was somewhat higher than in 1966-67, and can be expected to be very much higher in 1968-69. In addition to the higher cheese export subsidies already referred to, substantially higher rates of subsidization of casein and skim milk powder exports, together with the need to prevent further stock accumulation of the latter commodity, presage total export subsidies of \$17-19 million.

In summary, prices of almost all manufactured dairy products are currently supported, by offer to purchase, by government export at loss, or by subsidization of commercially arranged exports. In total, the treasury cost of these programmes has ranged between \$3 million and \$15 million in recent years, but in view of higher support levels the prospects are for higher expenditures.

(b) Direct Payments to Producers

In contrast to deficiency payments which commit the government to make good the difference between the average market price and a guaranteed price, direct payments supplement the market return by a pre-announced amount per unit of sales without any guarantee about the average total return. In the experience of the Canadian dairy programmes, however, the market price has been supported and though no guaranteed price has been set, the government has announced target prices. Rather it is the establishment of direct payment eligibility quotas which has made this form of subsidy truly distinctive. In combination with eligibility quotas, direct payments can be used to encourage rapid resource reallocation and structural change, to alter the distribution of income and in general to pursue a number of policy objectives. The very flexibility and selectivity of direct payments as a tool of policy, however, can lead rapidly to adverse shifts in production or through arbitrary change to considerable uncertainty. In brief, this tool places great power and responsibility in the hands of the agency administering the programme.

The treasury costs of direct payments have been high solely because the returns to recipient producers have been raised considerably above market prices. Direct payments in the sense of fixed subsidies per unit of sales are not new in the dairy programmes. Table II.5 shows the cost of these payments under various programmes from 1959-60 to 1967-68. Since the introduction of the new dairy policy, expenditure on direct payments has jumped to around \$100 million, as compared with \$20 million in 1965-66. Close to three-quarters of the benefits of these programmes have accrued to Quebec and Ontario, the major dairy provinces. However, public concern has been focused not on the increase in treasury costs but on the distribution and impact of the payments.

Quotas as marketing rights are not new to Canadian agriculture and have been used for over three decades in fluid milk markets. But quotas as

Table II.5. Distribution of Treasury Costs of Federal Direct Payments By Province; 1959-60 to 1967-68.^a

	Canada	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Whole Milk for Processing										
1959-60	10,964	138	147	95	3,177	5,868	150	149	457	781
1960-61	11,401	133	140	92	3,641	5,841	160	150	497	746
1961-62	12,618	137	154	98	4,008	6,574	176	109	470	892
1962-63	13,086	153	153	97	4,070	6,984	179	57	560	832
Cheddar Cheese Milk										
1963-64	4,666	37	-	19	1,942	2,540	28	-	65	33
First Grade Cheddar										
1964-65	908	10	-	4	379	488	6	-	15	6
Manufactured Milk and Cream										
1965-66	19,210	300	200	300	7,000	7,100	1,000	1,000	1,800	500
Direct Payments										
1966-67 ^b	93,861	1,545	538	1,110	39,291	33,564	4,417	4,225	8,842	321
1967-68 ^c	98,299	1,627	540	1,118	42,428	34,133	4,458	4,117	8,843	995

a Sources: for 1959-60 to 1965-66, Agricultural Stabilization Board annual reports and project estimates.
For subsequent years see footnotes b and c.

b Sources: Canadian Dairy Commission and project estimates.

c Sources: Canadian Dairy Commission. Includes additional payment from unused part of export subsidy fund.

rights to receive federal government subsidies are novel, and have appeared in the view of many to merit different consideration than marketing quotas. A major objection to quotas, once introduced, is that unless they are made readily negotiable, adjustments in the allocation and changes in the ownership of resources are impeded, with a consequent retardation of improvement in the efficiency of production and perpetuation of inequities between producers with and without quotas. The argument in favour of negotiability is increasingly accepted by those concerned with fluid milk market quotas, and in most such markets quotas are negotiable with at most modest restrictions. The possible danger of speculative trading in quotas can be avoided by requiring an interval between the acquisition and sale of quota,* by penalizing those quota holders who market less than their quota allotment, and by restricting trading in quotas to large minimum quantities. Another objection to negotiability is possible high prices of quotas which then add considerably and "artificially" to production costs. This argument, however, fails to recognize that it is not negotiability but the higher rate of return received by quota holders which makes the quotas valuable, and that the higher the return to quota holders and the more the availability of quotas is restricted, the greater will be the value of quotas. If these rights cannot be bought and sold openly, then their value will be built into the market prices of herds, farms or other physical resources to which quotas are attached under the programme. These values are "artificial" only in the sense that market returns are raised by marketing restrictions. The maximum price that an individual is prepared to pay for a quota is determined by the additional net return which he expects to get from his resources as a result of this right over a period of years. The minimum price for which a quota holder is prepared to sell his quota is determined by the value to him of the benefits thus foregone. In assessing the present worth of the anticipated future

* For examples of such regulations in fluid milk markets see the discussion under provincial policies.

stream of benefits individuals will discount these benefits by an appropriate rate of interest. That rate is likely to be higher than the commercial rate because of uncertainty about the magnitude of future benefits. Indeed one means of lowering the market value of quotas is to create uncertainty about the future of quota benefits; the corollary of this observation is that agencies or governments are often under pressure to provide assurances about the future of quota programmes so that quota holders will not experience losses on their investment in quota, or to ensure that they will realize capital gains on selling their quotas.

Do subsidy eligibility quotas merit different consideration than producer marketing quotas? What rights are conferred by a federal dairy quota? In an obvious sense, it confers a right to receive taxpayers' money, and from this observation many have inferred the impropriety of vesting quota holders with such a right for periods longer than a year. But this right is not intrinsically different from that enjoyed by fluid milk quota holders who receive what amounts to a tax on consumers of that product, or for that matter from the benefits enjoyed by producers of any commodity which is protected by tariffs, import licensing, or other devices. The Commission would appear to prefer to regard the federal quota as a means of allocating taxpayer funds rationally, and according to criteria of rationality selected by the Commission. Do these quotas impede resource mobility, or create inequities between those who have and those who do not have such rights? The Commission's response would appear to be 'no' on both counts: first, on the grounds that it is prepared to reallocate quota by reducing or eliminating the quota rights of those who do not sell as much as their quota allotment or who quit*, and increasing the quota allotment of those who sold in excess of their quotas; second, it is prepared to transfer

*Or who fail to produce as much as 12,000 pounds milk equivalent, under the present regulations.

quota to entrants to dairy production provided that their sales capacity is at least 100,000 pounds per annum. The Commission's opposition to making the quotas negotiable therefore, is not based on objection to efficient resource reallocation within the manufacturing dairy sector, nor to a wish to exclude potential entrants from direct payment benefits. Clearly the quotas do have value, but this value is transferrable from holders to entrants only when accompanied by the transfer, through bona fide sale, of the physical facilities required for milk production.* Since the Commission is willing to consider an application for quota transfer on the basis of properly documented offer of purchase and sale prior to the actual conclusion of the transaction, the value of the quota can be (and undoubtedly is) included in the sale price. Uncertainty over the future of the direct payment quota programme undoubtedly serves to reduce the capitalized value of quota which is added to the value of the transferred physical resources, but it cannot reasonably be argued that such capitalization is not occurring.

The Commission's resistance to negotiability is presumably based either on reluctance to declare explicitly its long-term dairy policy, or more likely on its unwillingness to sanction open trading of government subsidy rights. Neither basis appears to be justified. In the interests of promoting economic sized units, using modern dairy production techniques, a clear commitment to a long-run policy is imperative, and as pointed out earlier, the difference between subsidy eligibility and marketing quotas is insubstantial.

The criteria used by the Commission in reallocating quota seem to be (a) long-run efficiency of resource use, (b) equity between extant quota holders and potential quota holders, though with first consideration being given to the former, and (c) a definite limit on the total amount of quota and the total subsidy cost. Justification for the Commission continuing to assume responsibility

* Whether this includes solely the herd, or other physical facilities as well, is not clear. Available farmer reports indicate that transfers are occurring.

for quota reallocation in our view, can be based only on the grounds that that agency can more nearly satisfy the first two criteria than would an open quota market. We doubt that this premise is true, since it would imply that the Commission had detailed knowledge of at least the production costs and returns of quota holders and potential entrants. Should quotas be made negotiable, their value will become capitalized into production costs as they are sold, but this is occurring and will continue to occur so far as entrants to the programme are concerned. Capitalization of quota values into production costs admittedly is less under the present system for those quota holders who increase their quota by expanding production. In this case capitalization will occur through bidding for the requisite additional resources on the basis of expected returns from direct payments as well as from markets, and these resources would be characterized by a relatively elastic supply. The additional costs thus avoided, however, appear to be more than offset by the reduction in efficiency gains under a system of agency allocation of quota. Moreover, the pressures on the Commission with regard to its quota allocating powers and the difficulties of allocation decisions are bound to increase with time, resulting eventually in extremely difficult political choices.

The magnitude of any capitalization depends greatly on the future of the direct payments programme. If it is made clear that this subsidy will be gradually phased out, the value of quotas will be much less than if it appeared that the programme would continue with little change. Phasing out could be accomplished by progressively raising the minimum sales level for subsidy eligibility and/or by gradually reducing the unit subsidy payment. The former would provide most incentive for growth of larger enterprises and for the withdrawal of small enterprises. Although it would lead to the anomaly of subsidizing only the large producers, that subsidy might be phased out. Progressive reduction in the unit subsidy payment would make structural reorganization more dependent on market forces, and have the possible advantage of provoking less criticism on

the basis of differential treatment of producers.

The initial orientation of the direct payments programme was to raise substantially and immediately the incomes of dairy producers, many of whom were believed to be facing serious economic difficulties. Gradually the main emphasis of the programme has shifted toward stimulating the growth of economic sized units, which presumably would require much less government assistance. We can only speculate on the reasons behind this reorientation. Certainly it should have been clear from the start that whereas the producers facing the most serious income problems predominantly had small output units, the biggest subsidy payments would go to the largest producers. At best the programme has encouraged small producers to enlarge their scale of operations, at worst it has dissuaded many who should have found alternative employment from doing so. Obviously the majority of the small output dairy enterprises cannot be expanded to form viable units. From the viewpoint of the interests of these producers the programme was strictly short-run, and even short-sighted.

Since 1966-67 the number of manufacturing milk and cream producers participating in the direct payments programme has declined by approximately one-third. In 1966-67 there were just over 165,000 such subsidy recipients. Exclusion of any fluid shippers in the 1967-68 programme eliminated over 20,000 participants. But so far as manufactured milk and cream shippers were concerned no attempt was made in issuing quotas to restrict the number of participants in that year, in fact, the net change between quotas issued in 1967-68 and subsidy recipients in the previous year was only about 500. However, of the individuals who were issued subsidy eligibility quotas, 21,000 did not ship milk or cream and consequently received no subsidy. Subsidy recipients in 1967-68 thus numbered less than 144,000, a decline of 13 per cent from the previous year (Table II. 6). About 80 per cent of the 21,000 were shippers of less than 50,000 pounds, and predominantly they were located in the two central provinces and in the Prairies

Table II.6. Changes in the Number of Manufacturing Milk and Cream Direct Payment Recipients, By Sales Volume in 1966-67 and By Quota Volume in 1967-68, By Province.

	- 1966-67 -			- 1967-68 -			1967-68 minus 1966-67		
	Less than 50,000 lbs. and over	Total 50,000 lbs. and over	Less than 50,000 lbs. and over	Total 50,000 lbs. and over	Less than 50,000 lbs. and over	Total 50,000 lbs. and over	Less than 50,000 lbs. and over	Total 50,000 lbs. and over	
	- numbers of shippers -								
Canada	95,476	69,585	165,061	78,289	65,477	143,766	-17,187	-4,108	
P.N.I.	2,653	1,215	3,868	2,276	1,131	3,407	-377	-84	
N.S.	2,174	329	2,503	1,838	293	2,131	-336	-36	
N.B.	2,408	806	3,214	1,963	750	2,713	-445	-56	
Que.	20,171	33,171	53,342	16,334	31,681	48,015	-3,337	-1,490	
Ont.	13,466	23,049	36,515	9,724	21,516	31,240	-3,742	-1,533	
Man.	13,591	2,742	16,333	11,275	2,545	13,820	-2,316	-197	
Sask.	21,372	1,587	23,459	18,690	1,409	20,099	-3,182	-178	
Alta.	18,488	6,452	24,940	15,895	5,959	21,654	-2,793	-493	
B.C.	653	234	887	494	193	687	-159	-41	

a Source: unpublished data supplied by Canadian Dairy Commission. The numbers shown in 1967-68 correspond to those shippers who had quotas and shipped milk or cream. The 1967-68 numbers may not be entirely accurate due to the possible omission of records which were reported late.

(50 per cent and 43 per cent, respectively). In 1968-69 approximately 25,000 producers who had shipped less than 12,000 pounds of milk equivalent were excluded from the programme; of these 74 per cent were Prairie producers, and 18 per cent were in Quebec and Ontario. Another 8,000 producers in the 12,000 to 50,000 pounds class failed to apply for quota rights, and presumably went out of business, and we estimate that about 1,000 producers in the 50,000 pounds and over class also quit dairying. Thus, the total number of quota holders in 1968-69 is down to about 110,000 shippers, a reduction of over 23 per cent. It is not known how many of the 25,000 shippers excluded from the programme have actually gone out of dairy production; we would surmise that a minority whose production is based on exceedingly low cost pasture feed and family labour (especially in the Prairies) are continuing to milk some cows, but clearly their contribution to market sales is negligible.

The significant aspect of these changes is that the Commission has played a modest role in the rationalization which has occurred. About 30,000 of the 55,000 producers who have left the programme in the past two years went out of business in spite of federal direct payments. Without doubt a good proportion of the 25,000 excluded this year would have gone out of dairy production anyway, and, as already noted, a number of other small producers have no doubt continued in production notwithstanding the loss of subsidy payments. The Commission has done nothing to encourage small scale producers to find alternative employment, it has merely cut off from direct payments some 25,000 producers who have been receiving such subsidies for the past two years; in brief it has reversed (and presumably in its own view, corrected) the policy decision made in 1966 to encourage these producers to remain in production.* On the positive side, it should be noted that this year, in its first major

* It should be recalled that the 1965-66 programme specifically excluded shippers of less than 10,000 pounds from direct payments.

attempt at quota reallocation, the Commission has granted larger quotas to about 37,000 shippers of whom the great majority had had quotas in excess of 50,000 pounds. The increment in quota which they received was equal to the excess of their shipments over their quota in 1967-68 up to a total quota limit of 300,000 pounds. Clearly, producers in the under 50,000 pound class, predominantly operating a low investment dairy enterprise, were not as a group interested in expanding to sales of over 50,000 pounds (Table II.7). In contrast, about one-half of all producers in the larger sales classes exceeded their quotas, but the per cent by which they exceeded their quotas declined with size. This evidence strongly suggests that the upper limit of 300,000 pounds on subsidy eligibility acted as a disincentive to output expansion beyond this level, although the fact that the few shippers with quotas in excess of 300,000 pounds also increased their sales indicates that the disincentive was not absolute. Encouraging though these changes in the structure of the dairying sector are, the precedent created by allocating additional quota on the basis of sales in excess of quota is ominous. It could result in considerable expansion of milk output based not on current market returns, but on anticipated future returns from markets and direct payments. Without wishing to labour the point, we feel it necessary to stress that such reallocation could have been accomplished less arbitrarily and more effectively by permitting quota negotiability.

Government attitude toward the small output producers appears to have hardened as a result of evidence from the 1966 C.D.A. dairy survey which showed that a large proportion of these farmers had only a minor dependence on dairy income.* Undoubtedly concern about the treasury costs of the programme have

* Information supplied with the quota applications of producers who shipped between 12,000 and 50,000 pounds in 1967-68 confirms this view. Over 50 per cent of these producers derived less than one-quarter of their total farm cash income (inclusive subsidies) from dairying. However, this is not equivalent to saying that their dairy income was unimportant to them.

Table II.7. Sales in Excess of Quota in 1967-68.^a

Quota in 1967-68.					
	Under 50,000 lbs.	50,000 to 100,000 lbs.	100,000 to 200,000 lbs.	200,000 to 300,000 lbs.	300,000 lbs. or over
Total number of shippers	78,239	33,394	-----	31,583	-----
Number exceeding quota	5,048 ^b	16,615	12,864	3,127	997
% exceeding quota	6.4	49.0	-----	53.8	-----
% sales above quota	---	17.9	14.3	12.2	10.5
					143,766
					38,651

^a Source: Canadian Dairy Commission

^b Producers in this class had open quota up to 50,000 pounds, but only 5,048 expanded to this level of sales.

also influenced its development. Hopefully, the shift in the emphasis of its objectives reflects increasing government interest in long-run reorganization of the primary dairy sector. However, it must also recognize that direct payments geared to sales levels, like high market support prices, do little to significantly improve the welfare of poor farmers or the efficiency of production in the primary dairy sector.

(c) The total cost of dairy programmes

The diversity and number of changes in federal dairy programmes over the years makes ready assessment of the extent of government assistance difficult. Table II. 8 provides a summary of the treasury costs of these programmes and a means of partially gauging the degree of government assistance from 1962-63 to 1968-69. In total, treasury costs have doubled in recent years, primarily because of the new programme of direct payments to producers, introduced in 1966. Costs attributable to support of market prices, however, have also increased rapidly. If the incentives provided by higher total returns for manufactured milk and cream since 1966 do result in expanded production, market price support costs will continue to increase whereas direct payments costs are limited by global quotas.

While the treasury cost of dairy programmes has risen, the number of producers benefitting from this assistance has declined. Reasonably accurate estimates of the number of such producers are available only since 1965-66. The Agricultural Stabilization Board count of dairy farmers receiving direct payments in that year was 179,242;* in addition about 30 thousand producers with sales of less than 10,000 pounds and probably a similar number of fluid shippers were not entitled to participate in the programme. Therefore, the total treasury costs

* J. White and V.A. Heighton, The Structure of the Canadian Manufacturing Milk and Cream Industry.

Table II. 8. The Total Treasury Costs of Dairy Programmes
1962-63 to 1968-69

	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69
	\$(thousands)						
Direct Payments ^a	58,796	45,133	38,229	44,597	93,861	98,229	
Offer to Purchase Losses ^b	3,223	2,922	3,014	664	1,443	4,784	
Export Subsidization	2,838	876	1,005	2,541	7,770	10,153 ^c	
Total	64,857	48,931	42,248	47,802	103,074	113,236	130,000 ^d

a Includes all direct subsidies.

b Losses for 1965-66, 1966-67 and 1967-68 include project estimates of losses on end of year inventory.

c Total export subsidy fund, including any unused portion which would be paid as a direct subsidy bonus to producers.

d Canadian Dairy Commission budget. Other years do not include allowance for programme administration costs.

were in the order of \$250 per producer in 1965-66. The following year 165,061 manufactured milk and cream producers and about 21,600 fluid shippers received direct payments, possibly another 3,500 fluid shippers did not, and treasury costs averaged about \$500 per producer. In 1967-68 there were 143,766 producers receiving direct payments and possibly 21,000 fluid shippers who were excluded, so that the average total programme cost was close to \$700 per producer. From available information the 110,000 manufacturing milk and cream shippers with quotas in 1968-69 can be expected to incur total treasury costs of \$1,000 each, even after allowance is made for the support costs of manufactured products derived from milk produced by fluid shippers.

The consumer cost of support programmes for manufactured dairy products was at least \$100 million in 1967. The combined treasury and consumer costs of support programmes thus were over \$200 million, a total which may be compared with farm cash receipts from manufacturing milk and cream (inclusive of direct payments) of some \$470 million. A better perspective of the extent of government assistance is obtained from the fact that treasury costs alone amounted to one-quarter of all cash receipts from manufacturing milk and cream, and accounted for most of the net income from dairying.

(d) Policy planning

The federal government since 1965 has made a concerted attempt to develop policies oriented toward the problems of the primary dairy sector, instead of merely using price supports to bolster markets for dairy products. The existence of structural differences and attendant differences in economic problems within the sector have been acknowledged in the new policy, and measures have been implemented with the object of rapidly raising the incomes of manufacturing milk and cream producers, and of accelerating rationalization of the predominantly small scale structure of dairying. The semblance of a

long-run policy for the sector has been evolving.

Unquestionably, the newly created Canadian Dairy Commission has been essential to the administration of the new programmes and has contributed to the development of dairy policy. In our view, however, it is unfortunate that policy planning and policy administration were not made distinct responsibilities of co-ordinated but separate government bodies. The problems of policy administration compel a predominantly short-run concern and outlook. Policy planning, in contrast, must take a longer-run perspective, if it is to be effective. Assigning both these tasks to the Commission has made its responsibilities too broad, and as a consequence policy planning has suffered.

The objectives of the Commission as stated in the Canadian Dairy Commission Act are too general to provide clear criteria by which to assess the agency's performance, but the statement does broadly outline the Commission's responsibilities:

"The objects of the Commission are to provide efficient producers of milk and cream with the opportunity of obtaining a fair return for their labour and investment and to provide consumers of dairy products with a continuous and adequate supply of dairy products of high quality." (Section 8 of the Act)

Within budget constraints the Commission was given very broad powers to attain these objectives. The latter, in practice, appear to have been (i) raising incomes of producers whose earnings were judged inadequate, and (ii) re-organization of the structure of the industry to make it more efficient.

The predominance of low income problems among dairy producers has arisen from the fact that many of them operate small scale dairy enterprises on low output farms. Solutions to such problems in most cases require development of other farm enterprises or obtaining off-farm employment; few have the managerial ability and resources to expand their dairy enterprises to form viable units. Yet it is only through the latter alternative that the Commission is empowered

to resolve low income problems in dairying: it can encourage producers to expand their dairy enterprises or to quit milk production, but the main forms of adjustment lie beyond the authority of a commodity oriented agency.

Instead the Commission appears to be concentrating on rationalization of the primary sector. Its principal means for attaining this objective are the incentives provided by subsidy payments directed to those producers who, by virtue of their size or growth, the Commission wishes to encourage. Unfortunately, as the Commission succeeds in enlarging the size of dairy enterprises it will be increasingly directing its subsidy programmes toward large output producers for whom such assistance will be hard to justify, except on the grounds that these units had evolved in response to the Commission's programmes. To make the point crystal clear, we will suppose that the Commission succeeds in making 300,000 pounds of milk the smallest size of dairy enterprise: it will still have to subsidize dairy producers very heavily because their level of production and costs typically will be based on market returns plus direct payments. The treasury cost of dairy programmes is already difficult to justify. This expenditure, average over the 110,000 producers who are participating in the direct payments programme, amounts to about \$1,000 per producer, even after allowing for the benefits accruing to fluid milk shippers from price supports of manufactured dairy products. Many producers are receiving close to \$4,000 in benefits. Moreover, elimination of producers with sales below 50,000 pounds of milk will raise the average treasury expenditure per participating producer to close to \$2,000. Such rates of subsidization of dairy producers will inevitably create pressures for quid pro quo treatment by other farmers, and raise criticism by the nonfarm public of a policy which results in large treasury costs and prices of dairy products which are appreciably higher than world market levels.

Similarly, the handling of quotas reveals deficiencies in policy planning. In 1966, the first year of the new policy, the supply consequences of unlimited output subsidies were ignored, and most fluid shippers as well as all shippers to manufacturing markets were entitled to receive payments. (In 1965 fluid shippers and the ~~sma~~allest output producers had not been entitled to supplementary payments). In 1967 fixed quotas based on 1966 sales were introduced, producers were encouraged to limit their sales to domestic and commercial export market requirements, and fluid shippers were excluded from the programme. In 1968 quotas were increased by the amount by which quota holders in the previous year had sold in excess of their quotas, and the smallest output shippers were made ineligible for direct payments. These reversals in policy imply a trial and error approach to planning, and are inimical to the sound long-run planning by producers necessary for rationalization of the economic structure of dairying. The basis on which additional quota was allocated this year would seem certain to result in a substantial output expansion by producers in the 50,000-300,000 pound range in anticipation of a similar basis of allocation next year, unless producers are deterred by the uncertainties of the policy. The Commission could change its decision rule in 1969 to suit the expediency of the situation, but this consideration only serves to emphasize our concern about the lack of explicit long-run policies.

There is room for doubt also about the appropriateness of the Commission's pricing policies. These appear geared to accelerate the decline in cream shipments as a proportion of total sales, and to expand production of solids-not-fat dairy production beyond domestic requirements. It may be argued that such products are more readily disposed of on export markets than butterfat products, but it should be recognized also that the need for the high rates of export subsidization introduced after considerable hesitation in April of this year, will be a continuing one. The Commission may hope that the present

high costs of market supports and direct payments will gradually decline with the growth of the domestic market and the development of more efficient production units. However, it seems clear that such a hope cannot be realized for some years. Recent policies apparently have encouraged replacement of many small scale production units based on family labour and low cost feed by larger enterprises dependent on higher rates of return. Rising input prices, especially of labour, and capitalization of economic units accruing to larger scale dairy enterprises will tend to increase average production costs. Market prices, on the other hand, will not increase until reduced production and/or domestic market growth eliminate surpluses of dairy products.

In brief, our major concern about the direction of present dairy policy is that it appears to set aside the implicit basis of past policies - namely, the dependence of low-income areas on dairying, and to substitute what can be most generously described as an approach predicated on the eventual ability of a manufacturing milk industry to compete unsubsidized within a closed Canadian market. The feasibility of this objective appears most uncertain, the costs are unquestionably high, and the interests of low-income producers appear to have been overlooked.

(ii) A review of recent provincial pricing policies.

All provinces have legislation controlling the sale of milk for fluid use, and most provinces also have explicit policies but with more limited objectives, with regard to milk for manufacturing use. Fluid milk policies have been directed toward the twin objectives of enhancing producer prices and maintaining continuity of supply of quality milk to urban consumers. The genesis of provincial control in this market was the depression of the 1930's when economic conditions resulted in low prices, extreme competition among primary producers and distributors, and a threat to both the continuity of supply and the maintenance of milk

quality, especially from a health standpoint. Controlled entry of primary producers into this market created a favourable bargaining situation for fluid shippers, and in the relatively stable conditions of the post-war period the main issues with regard to fluid milk policies have been the level of prices and access by other milk producers to the fluid market. The urgency of these issues has varied with returns and alternatives to milk production; in the Prairie provinces, especially in Saskatchewan, comparative advantage has been associated with grain and with livestock enterprises other than year-round milk production, and even at relatively high fluid milk prices the issue of market access has not been of major importance. In many parts of Ontario and Quebec, year-round milk production has been strongly competitive with alternative enterprises, and pressure for entry into the fluid milk market by manufacturing milk shippers has been marked.

The purpose of this review is to outline provincial dairy policies, with special emphasis on those aspects which are closely related to federal policies.*

The discussion is divided into:

- (a) fluid milk marketing quotas
- (b) fluid milk pricing
- (c) price pooling
- (d) manufacturing milk policies
- (e) interrelationships between current federal and provincial dairy policies.

(a) Fluid milk marketing quotas. The method used to restrict access to fluid milk markets is that of marketing quotas. These quotas are obtained either by a contract with a dairy or are issued by a provincial authority such as a marketing board, which acts as an intermediary between dairies and producers. Quota holders receive a minimum (Class I) price, which is set by the provincial authority, for shipments

* Provincial legislation with regard to dairy substitutes is discussed in Section IV.

at least up to the amount of their quota. These quotas may be negotiable with limited restrictions, or they may be bought and sold only through sale of the dairy herd or farm. Where issued by a dairy, the ability of a farmer to increase his quota and the ability of other milk producers to enter the market without purchasing quota from an extant fluid shipper, is limited by the sales fortunes of that dairy. Moreover, average quota and non-quota milk prices, gross of transportation charges, vary under such circumstances, often considerably, from one dairy to another, even between producers with a similar percentage of quota. The reasons for this are usually based on factors affecting returns to the dairy from non-fluid product sales, but the very variation in producer prices gives rise to claims of producer discrimination, sub rosa practices, and of other inequities. Associated with producer-dairy contracts is the common restriction of milk collection and distribution to areas specified by the provincial authority, which results in reduced competition and inter-area inefficiencies in resource use.

The pros and cons of quota negotiability have been discussed in section II, (i), but comparisons of provincial approaches to this issue help to illustrate and amplify conclusions drawn in that section. In most provinces fluid milk marketing quotas are negotiable only by sale of the dairy herd. In British Columbia, Ontario, and Manitoba, however, quotas can be bought and sold separately from the dairy herd, and this is true also of Alberta although in that province the price of quota is fixed (currently at \$2.00) and the Quota Committee of the Public Utility Board exercises considerable control over such transfers. In Saskatchewan alternatives to fluid milk production appear to make the value of quotas very low so that negotiability has little current relevance in that province. While quotas do have a positive value in all other provinces, the current price is known only for British Columbia (over \$20) and Ontario (about \$6). Except in Ontario, quotas are tied to a particular dairy. The Ontario system under which the provincial

board acts as an intermediary between dairies and producers has advantages of flexibility and of facilitating market rationalization and control of transportation costs. But while avoidance of a direct relation with distributors is an advantage to many producers, the existence of major co-operative dairies creates difficulties for implementation of such a structure in most provinces. These difficulties have important implications for price pooling.

Quota volume is typically based on production in the months of lowest shipments. Such quota bases, of course, serve to encourage year-round production, while still permitting producers to vary output above quota levels in response to seasonal variation in production costs.

One of the most common fears expressed about quota negotiability is that it would encourage speculation, and thus permit substantial gains to accrue to non-bona fide producers and cause high or very unstable quota prices. Those provinces which permit negotiability have avoided these problems by stipulating that quota cannot be sold for some period after its acquisition: in British Columbia 5 years, in Alberta 2 years, in Ontario 6 months. Since the quota is treated as an obligation on the part of the producer to ship milk to the fluid market, quota holders who fail to ship at least their quota volume without appropriate cause are subject to loss of part or of all their quota rights. Stipulation of minimum quota volume for trading and shipping also serves to minimize speculation.

Experience with the resource reallocation effects of quota negotiability is limited, but in those markets where it is permitted the evidence supports the argument that negotiability furthers lower production costs through reallocation of resources from small to large producers.

(b) Fluid milk pricing. The methods used to price milk shipped by fluid producers vary among provinces and are complex. In general, producers receive a Class I or top price for milk shipped up to quota levels, a lower price for milk surplus to

fluid requirements but not to the requirements of dairies for non-fluid sales, and a still lower price for milk which is surplus to the total requirements of dairies. Although the definition of Class I milk varies slightly across Canada, all provincial agencies fix a minimum producer price for Class I milk. Generally they seek to establish minimum prices for other classes also, but the number and definition of classes, the extent of control and the method of determining appropriate floor prices, vary greatly. In British Columbia, formulas are used to set class prices; in Alberta production cost data and briefs submitted by producer, distributor and consumer groups are used to determine prices; in Ontario the Board seeks to ensure prices for milk used for manufacturing which are consistent with federal market support levels for manufactured dairy products; in Quebec prices other than for Class I are determined by negotiation between the trade and local (regional) producer boards. However, with few exceptions, the ability of the provincial policy authority to establish minimum prices for milk other than Class I and other liquid product classes is limited by inter-provincial trade, local processing costs and plant capacities, it is the federal market support programmes for dairy products which determine prices of the latter classes of milk.

Federal market price supports effectively create an almost perfectly elastic demand for milk for manufacturing use at levels very close to those currently prevailing. Since the demand for milk for fluid purposes is strongly inelastic, it is apparent that though provincial authorities are practising user price discrimination in milk markets, they are not maximising the short-run gains to such discrimination.^{**} Admittedly, provincial policy makers have been inhibited in raising fluid milk prices by lack of information about even short-run consumption

* Ice cream is a major exception because transportation costs permit wide regional price differentials.

** To maximise short-run gains, fluid milk prices would have to be raised to levels where the elasticity of demand was greater than unity. We have little basis for assessing exactly what levels would attain this objective, but it is clear that they would be very much higher than current levels.

effects, by fear of stimulating substitutes and altering preferences adversely toward milk in the long run, and also, in the Prairies, by direct consumer representation. Nevertheless, it seems clear that provincial authorities have not assumed the maximization of producer returns as the objective of pricing policy. In the post-war years, the retail price of milk (per quart container) has risen only slightly faster than the general level of prices, and the farm level fluid milk prices have been about constant in real terms. Manufacturing milk prices have fluctuated more and in real terms have declined over the post-war period.* Not surprisingly, it is manufacturing milk shippers who have been most concerned about price levels, and where such shippers account for a large proportion of all milk producers there has been major concern about the price advantage conferred to fluid producers. When allowance is made for the higher costs of production for the fluid market,** the costs of purchased quota rights, and the fact that fluid shippers do not receive Class I prices on all their production, the differentials between average returns to these two types of shippers are much less marked than between fluid and manufacturing prices. In Ontario, differentials in average market returns were between \$1.50 and \$1.90 per 100 pounds in recent years, while differences in costs between fluid enterprises and the larger manufacturing enterprises appear to be about \$1.35 (Tables I.13, I.16). However, such differences are large in relation to manufacturing milk prices, and in some provinces have caused concern about producer discrimination and stimulated interest in price pooling. The effect of federal direct payments has been to substantially reduce, though not eliminate, differences in net returns between typical manufacturing and fluid shippers.

* These are market prices and do not allow for direct payments to manufacturing milk shippers.

** Associated with health standards required and seasonal continuity of supply.

(c) Price pooling currently is practised in British Columbia, Ontario and in the Montreal markets. In its simplest form, pooling would mean paying all producers in a pool area the same price per 100 pounds of milk of standard butterfat content gross of transport costs. However, such a system would fail to reflect at the producer level the differences in prices between fluid and manufacturing milk markets, and would thereby encourage production resulting in dilution of pool prices. Pooling, as practised in Canada, is instead a means of providing all producers in the pool area with equal access to the higher priced market. It is closely related to the issue of negotiable quotas. Its implementation and advantages can be illustrated best by reference to the system being introduced in Ontario this year. On March 1, 1968, Grade A quality milk pooling went into effect for all existing fluid producers in the province. Prior to that date the proportion of quota to total production varied widely among fluid shippers, and without negotiability the disparities could persist due solely to local market conditions. Pooling gave all shippers an initially equal proportion of the fluid market relative to their production in the base period,^{*} and terminated individual producer-distributor contracts. As a result about 70 per cent of all fluid shippers received an increase in quota, while 30 per cent had their quotas reduced. The pool consists of fluid milk requirements plus a 10 per cent margin to allow for seasonal variation in supply-demand. At prices of \$6.10 for fluid and \$3.54 for the 10 per cent surplus, the pool price is \$5.86. Milk in excess of the pool quantities (i.e., in excess of 110 per cent of fluid requirements) is currently priced at the manufacturing price of \$3.54, suggested by the Canadian Dairy Commission as equivalent to its price support levels for butter and skim powder. Thus producers receive \$5.86 for their quota milk and \$3.54 for milk in excess of their quota. Negotiability of quota means that producers can increase or reduce their quotas. Moreover, effective September 1, 1968, manufacturing milk shippers who meet requirements for shipping

^{*} For most producers the quota base period was August, 1965 through July, 1966, exclusive of April, May and June.

to the fluid market are permitted entry into the pool on a graduated basis over a four-year period so that by September 1, 1972 they could have the same proportion of quota milk relative to their base production as existing fluid shippers currently possess. In addition, qualifying industrial shippers can purchase quota from extant fluid shippers. In British Columbia where pooling and quota negotiability have **existed** for some years virtually all qualified milk shippers have been absorbed into the pool, although their proportion of quota varies by virtue of production changes, sale and acquisition of quota, and graduated entry. Price pooling need not be accompanied by termination of producer-dairy contracts, and the existence of large co-operative dairies in many provinces does not favour the Ontario pooling model. However, maintenance of such contracts tends to tie producers to particular dairies and requires considerable regulation to minimize market imperfections and the resultant immobilities in resource use.

Thus price pooling together with quota negotiability serves to provide all qualified shippers with equal opportunity of access to the higher priced fluid market, while ensuring that production at the margin will be priced at the marginal market price.

(d) Manufacturing milk policies. Only Ontario and Quebec, the two provinces with a large manufacturing milk sector, have had price policies for manufacturing milk shippers. In Ontario, as explained above, this policy is oriented toward removing inequities between fluid and manufacturing shippers, and among manufacturing shippers in different parts of the province, through establishing uniformity in the terms and conditions of contracts, establishing uniform f.o.b. plant prices consistent with federal support levels, and pricing milk shipped by fluid producers but used for manufacturing purposes at manufacturing milk prices.

Prior to April, 1967, the province of Quebec subsidized manufacturing milk and cream shipments, initially through milk plants and subsequently by direct payments to producers. Processors in Ontario alleged that this programme permitted

plants in Quebec to procure milk requirements at lower cost and that this was unfair competition, while Ontario shippers were concerned that their counterparts in Quebec were being treated more favourably. The Ontario government introduced an equivalent subsidy in October, 1966, but the difficulty was finally resolved when, in April, 1967, the federal government assumed responsibility for all subsidization of manufacturing milk, increased its support prices, and both provinces agreed to discontinue their subsidy programmes. The situation illustrates well the dangers of provincial subsidies which distort inter-provincial competition and tend to competitive subsidization.

Provincial policy has played an important role in diverting cheese from domestic to export markets and by this means attempting to raise cheese milk prices and gross producer revenue. For some years Ontario, initially under the Cheese Producers' Marketing Board and most recently under the Milk Marketing Board, has practised a two-price policy whereby cheddar cheese was bought at prevailing prices on provincial exchanges and sold at a lower price on the British market. The difference was financed partly by a levy on all Ontario produced cheddar and partly by federal subsidies, but at the beginning of the current dairy year the Canadian Dairy Commission assumed the entire responsibility of subsidizing cheese exports.

All provincial policies influence market returns for manufacturing milk, indirectly through fluid milk price administration, and directly in many provinces through price setting for part of the surplus of fluid shipments. But for all practical purposes it is federal policy which currently determines the prices received by manufacturing milk and cream shippers.

(e) Interrelationships between federal and provincial price policies. Several aspects of the interrelationships between provincial and federal dairy policies have already been touched on. It is clear that dairy policies among different provinces and at the national level should not be implemented without recognizing

the regional interdependence of the industry. Indeed the Canadian Dairy Commission was intended to work with the provincial boards to facilitate policy co-ordination.

In many important aspects of dairy policy the division of responsibility between the Canadian Dairy Commission and the provincial boards is clear cut. The latter have responsibility for fluid milk markets, and market rationalization,^{*} as well as licensing and inspection of processing facilities and enforcement of standards throughout the industry. The Canadian Dairy Commission is responsible for determining minimum prices for major manufactured dairy products, for export subsidization and control of imports. However, there are several areas in which the activities of provincial boards and the federal agency overlap, and some which present potential conflicts of interest. In most instances any adverse effects of responsibility can be removed by consultation and agreement on the part of the agencies involved. The removal of competitive subsidization of manufacturing milk is one example. In the case of cheese export subsidies, it seems clear that if cheese milk prices were raised in one province, lack of control of diversion of milk from other uses to cheese, both in that province and others, would result in distribution of any benefits throughout the national primary sector. The payment of levies by cheese milk shippers in one province to help finance export subsidization would make their net benefits lower than that of shippers in other provinces. Obviously, such a programme can be financed equitably only at the national level.

The acceptance by the Canadian Dairy Commission of responsibility for export subsidization of cheese and the agreement by Ontario and Quebec to relinquish manufacturing milk subsidies still leave some major areas of potential conflict among price policy agencies. The base excess method of allocating increases in fluid milk quotas prevalent in most provinces tends to encourage over-production by fluid shippers, and in this case it is the federal government which has to pay

^{*} Standardization of terms and conditions of sale and related matters concerned with the removal of market imperfections.

the cost of underwriting provincial policy. Similarly, the difficulty of acquiring fluid quotas in many parts of provinces where such quotas are not negotiable means that any expansion by manufacturing milk shippers adds to the total supply; where quotas are readily negotiable such expansion can result in the transfer of a share of the fluid market to manufacturing shippers and thus substantially reduce or avoid an increase in total milk supply. In both these respects the recent changes in Ontario's dairy policy contribute to minimization of milk surpluses and serve to reduce the federal costs of support programmes. However, since under the Dairy Commission policy producers with fluid quotas have been ineligible to participate in the federal direct payments programme, part of the burden of support of returns to manufacturing milk was shifted from the Commission to the Ontario fluid milk pool. Nor was the contribution of the Ontario policy of quota acquisition through negotiability to the avoidance of surplus milk recognized at first by the Commission. As a result of negotiation between the Ontario Milk Marketing Board and the Commission, fluid shippers in the province are now to receive federal direct payments on all milk in excess of 125 per cent of their fluid sales up to the level of the federal quota which they held in the past. In the case of existing fluid shippers, their federal quota is determined as the volume of shipments on which they received direct payments in 1966-67; for manufacturing shippers transferring into the pool, the federal quota will be the same as prior to their transfer. Obviously, under these terms, few shippers participating in the Ontario pools will receive direct subsidies and those who do will typically receive small payments. But the change is a step in the right direction, if direct payments are to be continued. Precedent for payment of subsidies to fluid shippers existed in the application of the federal programme to British Columbia, where direct payments were paid on milk in excess of the pool quota.* It would seem patent, therefore, that fluid producers in other

* It is understood that pool participants in British Columbia are to receive direct payments under the same terms as apply in the Ontario agreement.

provinces could obtain similar eligibility for federal direct payments through the creation of a fluid milk pool. Such co-ordination of provincial and federal pricing policies to reduce the incentives to surplus production is clearly desirable both on the grounds of equity and of orienting production to market requirements.

Provincial and federal policies are complementary in the area of structural rationalization. The advantages in this regard of negotiable fluid quotas have been stressed already. Many provincial boards seek to encourage the development of larger, more economic sized units by other means as well. In Alberta, for example, this consideration is apparently given considerable weight by the Quota Committee in approving quota reallocation. Quebec has grant and loan programmes to help finance investments in dairy housing and equipment. It is significant that while several provincial dairy officials interviewed in the course of this study expressed concern about the exclusion of fluid shippers in their province from the federal direct payments programme, none indicated concern over the exclusion of any producers who shipped less than 12,000 pounds or considered this Commission ruling unreasonable.

Finally, it should be noted that for the purposes of long-run policy planning and implementation at both public and private levels, there is a continuing need for exchange of information and integration of programmes among provincial and federal agencies.

III. THE CHANGING STRUCTURE OF THE PROCESSING-DISTRIBUTING SECTOR

(i) Introduction

The processing-distributing sector of the Canadian dairy industry comprises close to 1,300 factories or plants, owned by nearly half as many companies, which employ about 33,000 persons and have a total value added of approximately \$350 million.* A large part of the sector is still made up of companies processing butter or cheese in small scale, single plants, and selling an essentially undifferentiated product, and of small, local dairies. But large scale and multi-product plants, operated by major corporations which sell a wide range of dairy products and have their own brand names, are integrating the sector across product lines, and through mergers and consolidations the degree of concentration in the sector is increasing markedly. Apart from the dairies, which in size and number vary in proportion to the distribution of population, the sector is located predominantly in Ontario and Quebec. Nearly three-quarters of all processing plants are in Quebec and Ontario, and these provinces account for a similarly large proportion of total sector sales. The regional distribution of plants classified according to the processed product differs considerably. Of the 545 butter plants operating in 1965, 35 per cent were in the Western provinces, and 60 per cent in the Central provinces, whereas of the 202 cheese factories, 92 per cent were located in Ontario and Quebec.** Condenseries and processed cheese plants were also heavily concentrated in the Central provinces, while ice cream manufacturing, which is commonly associated with the pasteurizing operation, was more widely distributed across the nation.

* The most recent data available indicates that in 1965 there were 1421 establishments, 33,475 employees with a total value added of \$303,809,000. The rough estimates in the text refer to 1967-68, and were based on recent trends.
Sources: Dairy Factories, D.B.S. cat.#32-209 and Process Cheese Manufacturers, D.B.S. cat.#32-210.

** Based on plants registered with the Canada Department of Agriculture.

The size of plants varies considerably. Butter and cheese plants tend to be the smallest and in 1965 averaged \$500,000 in sales. The average output of butter per plant was 264,000 pounds, and of cheddar cheese was 738,000 pounds. However, about two-fifths of Canadian butter production originated from 54 butter plants which produced over one million pounds. Predominantly these plants were located in Ontario and Quebec. Cheddar cheese plants in this output class (almost all situated in the Central provinces) accounted for 15 per cent of all cheddar plants and for 40-50 per cent of production. There were only 8 processed cheese plants in 1965, of which 5 had an output of over one million pounds, and the sales of the 8 plants averaged nearly \$9,000,000 per plant. Pasteurizing plants, ice cream manufacturers, and condenseries averaged \$800,000, \$1,100,000, and \$3,500,000 in sales, respectively. Unfortunately, available data does not identify the increasingly important multi-product plants with capacity to produce several products at low cost levels of output.

Except for the fluid milk distributors, dairy processors sell their products to wholesalers or to large retail chains. However, in most parts of Canada dairies are losing their share of the retail market. The high and rising labour costs of home delivery sales, the growth of the chains, the development of multi-quart containers, and the resultant differentials between store and home delivery prices are leading to a rising proportion of store sales of dairy products.

(ii) Sector trends

In several respects the processing sector in recent years has exhibited the same kinds of changes observed in the primary dairy sector. Changes in transportation systems, in production technology, and rising raw material and labour costs, have contributed to a decline in the number of plants, growth in output per plant and per man, and to a reorganization of the structure of the sector.

Of all dairy processing, butter production has probably been subject to most change. The decline in farm operated cream production has obliged small local creameries to collect cream from a wider geographic area, thus increasing their input costs, or discontinue operations. Offer-to-purchase programmes for skim milk powder in the 1950's and again in recent years have favoured butter and powder plants, since markets for the joint products have been assured. Continuous butter-making processes have made possible low-cost, large-scale production of butter and greatly improved quality control. Today most butter is made from whole milk. Recent studies have demonstrated considerable reduction in unit processing costs associated with increasing output. A synthetic model employed in a study undertaken for the Canada Department of Industry indicated that processing costs alone declined from 8.9 cents for cream processing plants with an output of 250,000 pounds to 5.2 cents for creameries with an output of one million pounds of butter; in the case of plants using whole milk, the processing costs allocated to butter production were estimated to decline from 5.4 cents per pound at an output of 750,000 pounds to 2.5 cents at an output of 4 million pounds.* Above an output of 700,000 pounds it was estimated that cream processing would result in higher unit costs than whole milk processing. A study in Alberta based on the operations of plants in 1966 revealed similarly substantial economies of size: plants with less than 200,000 pounds output averaged processing costs of over 11 cents per pound of butter, whereas plants producing more than one million pounds had unit costs below 5 cents.** Moreover, the study also showed that the small creameries through competition for supplies paid more per pound of butterfat input than the larger butter plants. Much the same conclusions about economies of size in butter manufacturing were drawn in a recent Quebec study.*** This study also found the investment costs required to receive cans to be much higher than that required for bulk receiving.

* Economies of Scale in Canadian Butter and Skim milk Powder Production, a study undertaken by Stevenson and Kellogg Ltd., for the Canada Dept. of Industry, 1967.

** Walter B. Rogers and Horace S. Baker, "An Economic Analysis of the Alberta Butter Industry," Canadian Journal of Agricultural Economics, Vol. XVI, No.1.

*** Gilles Lebel and Armand Lacasse, Economic Study of Manufacturing Costs of Dairy Products in Quebec, mimeo of English draft, 1967.

Cheese manufacturing includes cheddar, other raw milk cheeses, and processed cheese. Changes in demand from cheddar to other cheeses, the instability of cheddar exports, and, to a lesser extent than for butter, changes in technology, have contributed to a decline in the number of cheese plants. The Quebec study^{*} indicates that economies of size, though evident, are much less marked in cheese made from raw milk than in butter production. Processing costs per pound averaged 7.2 cents for plants with less than 200,000 pounds output and 6.3 cents for plants with output of 600,000 pounds and over.

Available data do not permit assessment of trends for butter and cheese plants separately, but since both types of dairy processing are characterized by a high proportion of small output plants, the trends would probably not differ greatly. Trends for both butter and cheese plants indicate an average decline of 45 plants or about 5 per cent per year, a slight decline in total employment and an increase in average sales per plant of about 8 per cent annually.

Wage rates in the processing sector appear to have increased more rapidly than in other manufacturing industries: the wage per worker rose by about 5 per cent per annum in the 1960's, nearly twice the rate of increase in all manufacturing.

Process cheese plants, condenseries, ice cream manufacturers, and dairies also have been subject to changes in technology which favour large volume plants requiring heavy capital investment. But new forms of packaging and merchandising, and changes in the structure of competition arising out of the development of the retail food chains have had a direct and equally important impact on the number and size of these processing firms. Condenseries, process cheese plants, and the larger ice cream plants, which typically have been operated by major corporations with wholesaling operations, are now faced with the countervailing power

^{*}
Idem.

of the retail chains. The impact of the retail chains on dairies, which were typically small firms serving local markets, predominantly through home delivery routes, had far greater consequences.* The retail chains have offered consumers lower prices for milk and other dairy items, and a greater choice of container sizes. More recently competition at the retail level has been heightened by the emergence of milk specialty stores in major cities which, by means of high volume sales and a minimum of services, . offer milk in 3-quart jugs at lower prices. The large capital requirements for modern pasteurizing and bottling plants, the need to meet the demand for diversified sizes and types of containers and types of products, and the bargaining strength of the supermarkets which are accounting for an increasing proportion of their sales, have combined to put great pressure on dairies to expand their businesses or to sell out to other distributors.**

The Dominion Bureau of Statistics data on milk pasteurizing plants correspond only very approximately to the dairy trade, but these data can be used as indicative of trends among dairies. These trends show an average decline of 25 plants, or about 3 per cent, per year; no significant change in total employment, and a growth in sales per plant of about 5 per cent annually. This change in structure is most pronounced in the urban centres. As Allan has shown, the degree of concentration in Ontario (which "is less than in any other province, except perhaps Quebec") has increased considerably in the post-war period; in 1945 the "Big Three" (Silverwoods, Bordens, and Dominion Dairies) accounted for 30 per cent of sales of fluid milk, cream, and chocolate drink, but for 35 per cent in

* This paragraph and the next draw on Duncan Allan's excellent article, "Concentration and Competition in Ontario's Fluid Milk Industry," Ontario Economic Review November 1965.

** The ultimate threat posed by the retail chains to the dairies is that the former will integrate back into the processing field as Loblaws has done in Ontario and as Safeway has done in the West, which in combination with the independent jug store operations could result in the dairies losing their markets altogether. It is significant in this regard that the large dairy companies have directly entered the jug store markets.

1961; more significantly, over the same period, the number of independents required to account for 15-20 per cent of total sales declined from about 55 to 12 firms.*

The implications of current trends are that in the long run the processing-distributing sector will be completely integrated across product lines, and operated by relatively few, large corporations. At this stage in the process and in the foreseeable future the degree of competition, in general, will be high and margins will be relatively low. In 1957, the Royal Commission on Price Spreads of Food Products found no evidence that the rate of return on net worth in this sector was abnormally high. A similar conclusion can be drawn from data for 1963 which indicate that the profit on net worth for dairy products manufacturing corporations averaged 9.5 per cent and was close to the average of other types of corporations.** More recent data would probably show less favourable profit ratios, especially for the retail dairy business.

Provincial governments through milk control boards have an important role to play in maintaining the degree of competition. Through licensing of firms, through designation of distribution areas for fluid milk products, and through administration of prices they can profoundly affect the degree of competition and the performance of these marketing firms. Restriction of entry into markets, either through withholding licenses to new firms or limiting the territory in which existing firms may sell, can reduce competition and marketing efficiency. Of course, too rapid a liberalization of conditions of market access could lend to excessive competition and deterioration of dairy marketing services. However, the conservatism of most milk control boards and the presence of the Combines Investigation Commission make this danger more remote. The existence of retail price differentials between cities in the same region and of uniform price increases among distributors within markets, suggest that the dairies still have considerable market power, the retail chains notwithstanding.

* Allan, op. cit.

** Canadian Imperial Bank of Commerce, Commercial Newsletter, April 1966. Based on data published in Taxation Statistics, Department of National Revenue.

Where the provincial milk boards administer retail prices* they effectively determine the marketing margin for fluid milk products. It is highly probable that these margins are set to cover the costs of the least efficient distributors, and thus serve to reduce price competition and to encourage other forms of promotion less advantageous to consumers. The most obvious instance of such provincial protection is in Alberta where identical store and home delivery prices for fluid milk products fail to provide consumers the option of lower prices through store purchases. The existence of fixed margins for processing-distribution provides considerable incentive for backward integration by chain stores into the processing field, as has occurred in the Prairies Provinces where retail as well as producer prices have been set by milk boards.

A similar kind of problem appears to prevail in Ontario for manufacturing milk products. The Canadian Dairy Commission has publicly stated that it views a price of \$3.54 per 100 pounds of manufacturing milk as the producer level equivalent of the support prices of 63 cents and 20 cents for butter and powder, respectively, and that it is up to the provinces to secure this manufacturing milk price. The Ontario Milk Marketing Board is the only provincial authority to have fixed a price of \$3.54 for manufacturing milk, and by this action has effectively set the margin for processors. Processors with high operating costs have undoubtedly found this margin too low, whereas the more efficient processors are able to gain profits which would not exist if margins were determined by market competition.

Federal price supports for dairy products have undoubtedly reduced short-run uncertainty for processors, and to this extent the support programmes have lowered processing costs. But the main impact of the federal programmes has been to increase processing costs. Seasonally stable prices have encouraged seasonal

* As in the Prairies, and parts of the Atlantic region.

instability of milk and cream production, which in turn has resulted in excess plant capacity throughout most of the year and in higher costs for processing. The year to year vagaries of federal dairy programmes by contrast have been a source of uncertainty for plant planning and investment.

IV. DAIRY PRODUCT SUBSTITUTES

With the major exception of margarine, experience in Canada and abroad with dairy substitutes is limited. Many of these products are of relatively minor importance, or are available in very restricted markets, and yet others, in various stages of development and market testing, are still to be introduced. Information on sales, and prices of substitutes is very limited. Data deficiencies, the limitations of conventional economic theory in analyzing changes in tastes, and legal considerations surrounding the introduction and pricing of dairy substitutes, make quantitative analysis of the prospective impact of these products on the dairy industry extremely hazardous. Instead, the economic, nutritional, taste, and legal aspects of substitutes will be examined in this section with a view to assessing possible policy strategies.

(i) The current position of dairy substitutes

It is useful to categorize substitutes according to the dairy product they are intended to replace. Fluid milk substitutes could justifiably include such products as orange juice, carbonated soft drinks and coffee, since part of the historical decline in milk consumption is attributable to shifts in consumption patterns to these beverages. However, the focus of current concern is on new products which ^{could} make much more severe inroads into the fluid milk market. Broadly, these products are of two kinds: filled milks which contain dairy solids-not-fat and vegetable oil, and synthetic milks which contain no dairy ingredient, with the possible exception of sodium caseinate. Other types of milk which will be discussed briefly are reconstituted, sterile, and concentrated milks which are exclusively dairy products in content. Butter substitutes include margarine, butter-margarine mixtures, and a new low fat dairy spread.* Margarine is a synthetic

* Contains 35 per cent butterfat (81 per cent in butter) and 17 per cent solids-not-fat.

product usually, although it can include nonfat milk solids, while butter-margarine is clearly a filled product. Other dairy substitutes include a large number of products which can substitute for cream, ice cream, sour cream, cheese, and other less important dairy products.

Substitute fluid milks have not been marketed in Canada, although reconstituted, sterile and concentrated milks have been introduced. The latter products have been marketed either where fluid milk is not readily available,* or as an attempt to provide a lower priced substitute to whole milk. But provincial boards have circumvented the ability of these products to compete on a price basis in markets supplied with whole milk, by charging the processors for ingredients at class I prices or by banning reconstitution. Filled and synthetic milks have been marketed in the United States. However, though available in nearly 20 states, substitute milks represent over one per cent of class I sales only in Central Arizona and Hawaii. Most of these sales were of filled milk. In Central Arizona, filled milk sales were equivalent to eight per cent of the fluid market in April, 1968. In Hawaii, filled milk sales amounted to about twenty-five per cent of the fluid market in July, 1968.

Margarine was introduced into Canada in 1949 and it has since replaced a large proportion of the market for butter. But it is only since 1965 that the sale of margarine has been legal in all provinces, and if per capita consumption of margarine is calculated on the basis of the population which (legally) had access to the product the trend in its substitution for butter is much less marked (Table IV.1). Per capita consumption of margarine reached a peak of 13 pounds in 1960; in 1961 its sale was made legal in Quebec, and low levels of margarine consumption in that province, together with lower real prices for butter since 1962, have reduced average margarine consumption to about 9 pounds. Butter consumption

*Milk reconstitution from butterfat and skim powder has been a common practice in the Prairies to meet winter shortages of whole milk, and still is practised in Saskatchewan and in some remoter parts of the country. Concentrated milk, which has one-third the volume of whole milk, is also important in the more remote areas.

Table IV.1. Consumption of Margarine and Butter in Canada
1948-1967^a.

Year	Population with access to margarine	Per capita consumption of margarine	Per capita consumption of butter	Per capita consumption of butter and margarine	Margarine as proportion of total sales of butter and margarine
	%	lbs.	lbs.	lbs.	%
1948	-	-	28.7	28.7	-
1949	70.3	7.8	23.5	31.3	18.8
1950	70.2	9.7	22.3	32.1	23.4
1951	70.2	10.9	21.2	32.1	26.5
1952	70.3	10.1	20.7	30.8	25.5
1953	70.4	10.5	20.7	31.2	26.4
1954	70.5	10.7	20.4	31.1	27.0
1955	70.4	11.4	20.3	31.7	28.3
1956	70.4	11.0	20.5	31.5	27.4
1957	70.5	11.1	20.3	31.4	27.9
1958	70.5	12.1	19.1	31.2	30.8
1959	70.5	12.6	18.1	30.7	32.8
1960	70.4	13.3	17.0	30.2	35.5
1961	99.2	10.2	16.5	26.7	38.0
1962	99.2	10.0	17.9	27.9	35.6
1963	99.1	9.3	19.1	28.3	32.4
1964	99.2	9.1	19.1	28.2	32.1
1965	100.0	8.6	18.6	27.2	31.6
1966	100.0	9.0	17.8	26.8	33.5
1967	100.0	8.9	16.8	25.8	34.6

^aSource: Dairy Statistics, Dominion Bureau of Statistics cat.#23-201; Oils and Fats, Dominion Bureau of Statistics cat.#32-006.

^bRefers only to population with access to margarine.

per capita has declined from about 28 pounds prior to 1949 to a current level of about 17 pounds. Current consumption patterns in the United States differ greatly; butter consumption is only about 5 pounds per person and margarine is about 11 pounds. Apparently Canadians have a much stronger preference for butter, and per head consume about 10 pounds more of the two spreads. Differences in preferences are apparent in the consumption per capita of other dairy products and should be allowed for in using United States experience as a basis for assessing the impact of substitutes in Canada. Of the total Canadian market for margarine and butter, margarine in its first year of sale accounted for 19 per cent (Table IV.1). Its share trended up to 38 per cent in 1961, fell with the 1962 reduction in butter prices and has started to increase again only in the past three years. Not all margarine sales should be regarded as substitution for butter; in those provinces where it was available, about one-quarter of margarine sales initially displaced sales of cooking oils and fats. The marketing of new oils and fats since 1949 has reduced total per capita consumption of butter and margarine.

Mixtures of margarine and butter have been sold in several countries,^{*} but not in Canada. Recently a dairy spread with low fat content and using solids-not-fat as an ingredient was introduced in Ontario but as yet little is known about the success of the product.

Many substitutes for other dairy products are currently available in Canada. Coffee whiteners, frozen desserts, dessert toppings, and sour dressings, all made without dairy ingredients, are available in several provinces. Their importance is not fully known. One study^{**} based on a 1967 survey of Ontario, a province with relatively liberal regulations regarding dairy substitutes, estimated non-dairy products to account for 57 per cent of the market for coffee whiteners, 36 per cent of the dessert topping market, less than 1 per cent of the

* Including Great Britain, United States, Australia.

** Giblon, R.E., The Penetration of Substitutes for Milk Products into the Ontario Retail Chain Store Market, Ontario Department of Agriculture & Food, 1968 (not yet released).

frozen dessert market, and a negligible per cent of the sour dressing market. These proportions would be much lower in most other provinces. Possibly indicative of Canadian prospects, the substitute share of the market for dairy products in the United States is approximately estimated at 35 per cent for coffee whiteners, 5 per cent for frozen desserts, 60 per cent for dessert toppings, and much less than half of one per cent for fluid milk. For all dairy products, the share of substitutes in the United States is said to be about 25 per cent, with margarine accounting for the largest proportion of substitute sales.

(ii) Substitute ingredient costs and milk pricing

Substitutes for fluid milk are presently regarded with the greatest alarm by dairy farmers, since of the major dairy products fluid milk is potentially the most vulnerable to substitutes. Dairy price policies, the low cost of substitute ingredients of vegetable origin, and the development of new processing techniques have together provided considerable incentives for the development of substitute milks which can be retailed at prices lower than for dairy milk.

Synthetic milks, first developed for children allergic to cow milk, are processed from vegetable oils typically, coconut, solids of soybean and corn origin, and additives for emulsification, stability and flavour. Filled milks are processed from skim milk, vegetable oils and additives, and have a flavour which makes them more acceptable than synthetic milks. The ingredient costs of substitute milks are clearly lower than the cost of dairy milk. In the United States the wholesale cost of vegetable oils is about 12 to 14 cents per pound compared to about 82 cents for butterfat, skim milk powder is about 21 cents per pound, and the price of soya flour (the synthetic milk replacement for skim milk) is about 8 cents. An unpublished Michigan State University report estimates the ingredient cost per quart of substitute milks at:*

* U.S. cost data converted to Imperial quart basis for comparability with Canadian data. See Appendix IV.A for details.

Vegetable oil, emulsifiers, etc., and

(a) liquid skim (manufacturing price)	4.60¢
(b) liquid skim (fluid price)	10.18¢
(c) skim milk powder	6.67¢
(d) soya flour	3.43¢

The equivalent cost of fluid milk (at \$6.00 per 100 pounds) is 15.5 cents. These differentials are not greatly altered by processing costs, and substitute processors are able to offer distributors substantially larger margins than are customary in the fluid milk trade.

In Canada, the cost of vegetable oils is higher, and the cost of butterfat lower than in the United States. Coconut oil, the typical vegetable fat used in substitute milks, is about 50 cents per pound less than butterfat in Canada. Soya flour is about 14 cents per pound or only 7 cents less than skim powder. The price of skim milk based on the price of manufacturing milk is less in Canada. Equivalent ingredient costs per quart of the various milks in Canada would be:

Vegetable oil, emulsifiers, etc., and

(a) liquid skim (manufacturing price)	4.81¢
(b) liquid skim (fluid price)	11.71¢
(c) skim milk powder	7.00¢
(d) soya flour	5.27¢

Thus, a filled milk could be produced for much the same ingredient costs as in the United States if skim powder or liquid skim priced at manufacturing levels were used, but the costs of synthetic milk or filled milk based on class I prices for its dairy component would be higher. Assuming similar margins as in the United States, filled milks could be expected to retail for about 3 cents per quart less than standard fluid milk (and only about 1-2 cents less than two per cent milk) if the dairy solids-not-fat were priced at class I levels. Synthetic milks have nutritional deficiencies, which if made good, would result in similar retail differentials.

In Ontario, retail price differentials between other dairy products and their substitutes have been estimated at:*

- ice cream/non-dairy frozen dessert	28¢/gal.
- whipped cream/non-dairy topping	-3.2¢/cup
- sour cream/non-dairy sour dressing	-1.0¢/oz.
- coffee cream/non-dairy coffee whitener	0.5¢/cup whitened
- butter/margarine	27¢/lb.

Obviously some substitute products do not compete on the basis of price. Indeed the range in characteristics and prices of substitutes makes price comparisons difficult.

The ability of substitutes to compete depends on (a) price, (b) promotion, (c) flavour, (d) shelf life and other convenience features, (e) nutritional attributes. While low cost ingredients usually afford substitutes pricing and promotional advantages, these are not sufficient to guarantee their success. Nevertheless, it is significant that substitutes have had their greatest impact in areas where milk costs are highest: in Arizona the retail differential between whole and filled milk is 6 cents per quart, and in Hawaii it is 12 cents per quart, whereas in the northern states the price of filled milk is 1-2 cents less than that of two per cent milk.

(iii) Flavour, nutrition, and consumer tastes

An important factor in the acceptability of substitutes to consumers is the extent to which the substitute resembles, or even improves on, the flavour of the dairy products. In general, the synthetic dairy products at present have flavours which are considered inferior to the natural dairy products. But, there are exceptions among the whipped toppings, and, more significant, the case of margarine shows that a taste for substitutes can be acquired, especially in childhood. The development of chemical flavour technology is annually improving the

* Giblon, op. cit.

ability of processors to simulate the flavour of natural products. While opinions about the quality of synthetic flavours differ, the following quotation from the Michigan study previously mentioned, appears to summarize the present situation well:

"Despite the advances made in flavour technology, it should be pointed out that on the basis of the present state of the art and science of synthetic flavour formulation, very few if any synthetics match exactly and truly the flavours of natural origin. Much additional research will be required before synthetic flavours are equal to, let alone superior to, most of the natural flavours of food."

These qualifications on the palatability of substitutes apply only to a much lesser degree to filled products. In addition, the problems of flavour simulation would apply only to the vegetable fat component. It is worth noting that reconstituted milk, when well prepared, is practically indistinguishable from whole milk.

With regard to convenience features, the substitute dairy products often excel over the natural products. Again quoting from the Michigan study,

"Product attributes such as longer shelf life, stability toward freezing and drying, foam stability, spreadability, whipability, blendability, . . . can be engineered into a specific fat system as needed or desired. A single fat system and closely prescribed standard of composition [characteristics of natural dairy products] would not permit this high degree of functionability."

Much of the consumer appeal of substitutes such as soft margarine, coffee whitener, and some dessert toppings, is based on such convenience features.

A different kind of consideration is the nutritional equivalence of substitute and natural dairy products. The issue is the possible hazard to human health of nutritionally deficient substitutes, especially since a large proportion of some nutrients are derived from dairy products. For the United States it has been estimated that dairy products, excluding butter, account for 76 per cent of all calcium, 38 per cent of all phosphorous, and 23 per cent of all protein intake

by human beings.* Since Canadian consumption of dairy products tends to be higher, and consumption of meats tends to be lower than in the United States, an even higher dependence on natural dairy products for these nutrients can be expected in this country. Further it should be noted that this dependence would be very much higher among children and teen-agers. Most of the concern about nutritional inadequacies of substitutes has been directed toward substitute milks, apparently because synthetic ice cream consumption is of minor importance in most regions, and because the dangers of high cholesterol intake associated with butter consumption have been conceded. In fact only the synthetic milks appear to have serious nutritional deficiencies. These products have less than one-sixth the calcium content of natural milk, less than one-quarter of the protein content, and about one-half the phosphorous content. Though these deficiencies can be made good, the additional cost removes much of the price advantage of synthetic milk. For example, the additional cost of raising the protein content of synthetic milk to the natural milk level of 3.5 per cent is about 4 cents per quart. Apparently there is uncertainty, too, as to whether calcium additives to synthetic milk can be utilized by the body unless ingested with lactose.

In the United States the major milk companies, with the exception of Carnation in Arizona and the West Coast, have deferred marketing substitute milks pending a statement from the National Council on Nutrition about the nutritional adequacy of substitutes. These companies apparently have been worried that their image would suffer if they offered nutritionally inferior products, but once the Council's view of dairy substitutes is released they can be expected to market those products which are substitutes nutritionally, presumably including filled

* U.S.D.A., National Food Situation, November 1967, p.32. This subsection draws on the following sources: Substitute Dairy Products, unpublished Michigan State University mimeo previously referred to; personal communication from Professor Glynn McBride of Michigan State University; Frank Groves "Real," "Filled," and "Imitation" Milk - Some Nutritional Facts, University of Wisconsin mimeo; and Ron Knutson, Some Observations on Imitation Milk, Department of Agricultural Economics, Purdue University.

milk. So far as the Canadian situation is concerned, the major issue appears to be whether any substitute milks should be permitted unless their nutritional value is at least equivalent to natural milk. While appropriate labelling can help to distinguish substitutes, the possible deterioration in the diet of consumers of these products should not be ignored.

Finally, it may be noted that though the post-war decline in milk consumption is sometimes attributed to consumer concern about cholesterol intake, and though substitute milk has been thought to reduce cholesterol intake, neither view is supported by evidence from consumer surveys and the fat content of most substitute milks. Coconut oil, used in nearly all filled milks, has a much higher saturated fat content than butterfat. The great majority of consumers have not associated milk consumption with heart disease, although probably between 25 and 50 per cent of the American public identified milk as a high calorie food and would consider that milk consumption should be limited by persons with dietary problems.* The trend toward concern about lowering caloric intake does have important implications for the dairy industry, but the growth of two per cent milk and of iced milk sales** exemplify the ability of the dairy industry to meet the demand for low-fat foods.

(iv) Substitute legislation

The bulwark of defence by Canadian primary dairy producers against substitutes has been legislation. While margarine and synthetic coffee whiteners may be sold legally in any province, the sale of other substitute products is

* Montgomery, Mabel, A Review of the Literature on Consumer Attitudes Toward Milk Consumption, "Giannini Foundation of Agricultural Economics, University of California, 1964.

** Ice milk sales in the United States have grown rapidly throughout the post-war years and now account for 23 per cent of the frozen dessert market; this product can be credited with the failure of the filled ice cream, mellorine, to increase its market share in the past six years. Mellorine sales amount to less than 5 per cent of total market sales.

prohibited in some provinces, and subject to restrictions in most provinces.* The Federal Food and Drug Directorate, moreover, is apparently unwilling to approve the sale of synthetic milk anywhere in Canada until it has determined on the criteria by which to judge the nutritional equivalence with natural milk. Newfoundland does not have any legislation to prohibit the sale of dairy substitutes. In Nova Scotia, New Brunswick, Manitoba, Saskatchewan, and, with some exceptions,** British Columbia, the manufacture and sale of any "imitation" dairy product is prohibited, margarine being excluded from this designation. Prince Edward Island has legislation (The Dairy Products Act) which provides for the introduction of regulations to prohibit the manufacture and sale of filled products. In most provinces legislation pertaining to margarine specifies the prohibition of blends with butter. In Ontario, the Edible Oil Products Act prohibits filled products. In Quebec, the manufacture and sale of any dairy substitute is permitted only by a one-year permit issued by the Minister of Agriculture and Colonization, and the Dairy Products Act makes it illegal to have dairy product substitutes or vegetable oil in dairy plants. Canadian legislation in this area is clearly more restrictive than in the United States where 14 states permit the sale of synthetics only, 27 permit the sale of both filled and synthetic products, and 4 states have no laws concerning either filled or synthetic products.

However, American experience with regard to the legality of restrictions on the sales of substitutes should not be regarded as a pattern for court decisions in Canada. Unlike jurisprudence in the United States, where the legality of prohibiting the sale of substitutes has been successfully challenged on the grounds of constitutional rights, under Canadian law rights can be withdrawn by parliament or legislatures, subject to the approval, tacit or explicit, of the electorate.

* For information pertaining to the current legality of sales of substitutes we are indebted to W.R. Redelmeier, the senior author of an unpublished and confidential Ontario Department of Agriculture & Food manuscript on dairy substitutes, and to the departmental administrators who authorized release of the manuscript.

** "Other than classes of products such as toppings and spreads which the Minister may exempt from classification as imitation milk products." B.C. Milk Industry Act.

This is not to say that substitute legislation in this country cannot be challenged, but rather to point out that the grounds for court action to permit the introduction of substitutes where they are now banned would have to be other than the violation of constitutional rights. One argument for permitting the sale of synthetic products is that they are not substitutes for existing dairy products but are (legally) unrelated products.* In this regard, provincial legislation exhibits some divergent views; for example, margarine in British Columbia must be labelled prominently, 'a substitute for butter' while in New Brunswick the labelling cannot even suggest that margarine is a substitute for a dairy product or that it bears a relationship to one. Further inconsistencies are apparent in permitting the sale of non-dairy milk for children allergic to cow milk, yet banning the sale of synthetic milk, although the two products are extremely similar in composition. But perhaps it is unreasonable to expect logical consistency and uniformity of views on issues as emotionally charged as natural versus synthetic foods.

(v) Substitute policy strategies

The alternative strategies open to dairy farmers and the governments acting on their behalf can be reduced to three: (a) continue to deal with potential new substitutes by legislative prohibition, (b) permit the sale of substitutes but use pricing or taxation to reduce the price advantage of these products, (c) permit unrestricted competition between dairy products and potential substitutes.

The prospects for success of the first strategy appear to be good. Price relationships between dairy and non-dairy ingredients are less favourable to substitutes than in the United States, where new substitutes have had a major impact only in those states where dairy product costs are high. Canadian law appears to make prohibition of substitutes more difficult to challenge, and

* Whatever the legal distinction which might be made, this argument cannot be based on the economic interpretation of substitutes.

certainly the costs of such legal action would be high. In most instances the flavour of substitutes is still inferior to dairy products, and some substitutes are nutritionally inferior. Under these circumstances neither consumers nor potential substitute processors have much incentive to press for changes in substitute legislation or to question its interpretation through court action. Nevertheless, improvements in synthetic flavour formulation and in processing techniques inevitably will reduce the advantages of the dairy over the substitute product, and future public support for (or lack of opposition to) legislation banning substitutes will depend greatly on consumer attitudes toward dairy product pricing and development. In the case of substitute milks, pricing of fluid milk will be a major determinant of consumer attitudes and of processor incentives. For other dairy products, development of new products which meet consumer demands, such as caloric content, storability, etc., also will condition consumer attitudes.

If the sale of substitute milks were permitted it would still be possible to raise the cost of the substitute to make it non-competitive with fluid milk. For example, the dairy solids-not-fat component of filled milk sold in U.S. markets controlled by federal orders is priced at class I levels. It would seem difficult to enforce such a ruling in Canada if the fluid milk authority were a provincial board and the filled milk processor used skim powder produced in another province. But, subject to public support, other means of reducing the price advantages of substitute milks could be implemented; for instance, in California a specific tax on substitute milks was recently introduced. In essence, these are attempts to accomplish by pricing what was not possible through legislative prohibition. There appears to be little to choose between the two means, except that outright prohibition may avoid some of the legal problems of discriminatory pricing or taxing. Ultimately, the basis for either approach is public goodwill towards fluid milk producers. Clearly, it is in the interests of fluid shippers to retain that goodwill.

Finally, milk producers might elect to deal with substitutes by means of outright product competition. In the long run this defence is the strongest, and though it is most improbable that producers will sanction rescinding of substitute legislation for many years yet, any improvement in their competitive position through pricing and product development will lessen the threat of market erosion by substitutes.

V. PROJECTED DEVELOPMENTS -- A FRAMEWORK

(i) Demand relationships for dairy products

For the purpose of assessing the consequences of alternative price policies, a model was developed to project domestic consumption in terms of four major categories of dairy products: fluid milk, butter, cheese, and "other" milk products. In part this classification was dictated by available data on retail prices, but with the exception of "other" milk products the categories relate to fairly homogeneous groups of products, and are appropriate for assessing the effects of changes in prices. The demand for skim milk powder was examined separately because of its importance in federal price support programmes.

Per capita domestic disappearance of each of these categories of products was expressed as a function of real prices and real disposable income per capita. The effect of changes in income and of changes in tastes were not separated, and the coefficients of the income variable are more correctly termed "income-trend" coefficients. Following Goreaux,^{*} the quantity-income relation was expressed in a log-inverse form, which builds in the Engel assumption of declining elasticity values as income rises. The price variables were expressed as natural numbers to incorporate the assumption of price elasticities declining with prices.

Demand relations for fluid milk could not be established by these methods and were estimated by other procedures. (See Appendix V.A) The demand equation for butter allows for the legalization of margarine sales in some provinces during the period studied, 1957-66. The equation for "other" milk products measures the demand for milk in the manufacture of such products as ice-cream. When butter prices decline substantially, as they did in the early 1960's, butter tends to replace milk in the manufacture of these products and consumption of

^{*} L.M. Goreaux, "Income and Food Consumption," Monthly Bulletin of Agricultural Economics and Statistics, Vol. IX, No. 10.

milk in this market declines. The results of these equations are presented in Table V.1. Elasticity estimates for specified years are given in Table V.2.

It is of particular importance for price policies that the price elasticity is low for fluid milk and high for butter. The negative income elasticity estimate for butter is thought to reflect trends in taste and not to indicate that butter is an inferior good. Similarly, the high income elasticity estimate for cheese and the negative trend in fluid milk consumption per capita are believed to be attributable to changing preferences.

The price elasticity for skim milk powder is low. The demand equation for this product relates to the average domestic disappearance of all skim powder per person. In fact, only about one-quarter of total consumption of the product is attributable to purchases by households of skim powder. About 10 per cent is used in livestock feeds, and the balance (65 per cent) is used by food processors, particularly in the baking and dairy product trades. Analysis of each of these markets did not reveal a higher demand response to changes in prices than in the total market. Household consumption of skim milk powder increased substantially in the late 1950's when an "instantized" product was introduced, but per capita consumption has declined since 1961 and appears to have been particularly unresponsive to retail price fluctuations.* However, estimates for the United States indicate that the food processing trade demand is highly elastic to the price of skim powder,** and discussions with the trade in Canada indicated that a similar situation might emerge in this country if skim powder prices were to rise much above their present high levels.***

* Surprisingly, skim powder does not appear to have been a major substitute for fluid milk in the Canadian market as a whole. (See L.E. Drayton, "Consumption of Powdered Skim Milk in Canada," The Economic Annalist, June-August, 1965.) A significant relationship with fluid milk prices was not found in this study.

** Robert H. Miller, "Trends in Nonfat Dry Milk," in U.S.D.A. Dairy Situation, March, 1965.

*** In nominal terms, skim powder prices are higher than at any other time in the post-war period; in real terms, current price levels were exceeded only in the late 1950's.

Table V.1 Demand Equations for Dairy Products in Canada^{a.}

	Dependent Variables - Per Capita Consumption of		
	Cheese	Butter	Other ^b Milk Products
Constant	1.950	1.305	1.712
			1.433
Retail prices in \$ ^{b.}			
Cheese	-.662 (.161)		
Butter		-1.158 (.160)	.387 (.106)
Margarine		1.056 (.234)	
Skim Powder ^{c.}			1.158 (.425)
Disposable income per capita (\$'000's) ^{b.}	.780 (.027)	-.439 (.108)	.532 (.177)
Proportion population with access to margarine		-.114 (.043)	
Coefficient of Multiple Determination	.992	.922	.695

^{a.}Based on 1957-66 data. Sources: Dairy Statistics, D.P.S. cat.#23-201, Prices and Price Indices, D.B.S. cat.#62-002.

Functional form of equations: $\log_{10} Q = f(-1/Y, P \dots Z)$, where Q = per capita consumption, Y = per capita disposable income, and, $P \dots Z$ = other independent variables.

^{b.}Deflated by the Consumer Price Index.

^{c.}Wholesale price of spray process skim powder.

Table V.2 Demand Elasticities for Dairy Products in Canada,
1966 and 1980^a.

	Own Price 1966	Cross 1966	Income-Trend ^b .	
			1966	1980
Fluid milk	-.276		-1.1 ^c .	
Cheese	-.913		1.351	.907
Butter	-1.242	.608	-.751	-.510
"Other" milk products		.415	-.357	-.239
Skim milk powder	-.324		.922	.618

^a. Based on estimated demand relationships shown in Table V.1 and Appendix V.A

^b. 1980 projection of per capita disposable income in constant 1949 dollars derived from Shefrin, Cavin and Yankowsky, Demand-Supply Projections For Canadian Agriculture, 1980, Project No. 16, Federal Task Force on Agriculture, 1968.

^c. Per cent trend in per capita fluid milk consumption. (See Appendix V.A)

(ii) The impact of two per cent milk

Correct estimation of total consumption of dairy products necessitates full accounting of the many different kinds of products into which milk and cream are processed and appropriate conversion to some common measure of milk content, such as whole milk of 3.5 per cent butterfat content. If the accounting system used does not take into account new dairy products, estimates of total consumption may be incorrect. Two per cent milk is a case in point.

Two per cent milk has been sold in most major urban markets in Canada for many years, but it is only in the 1960's that the product has become generally available, and only since 1964 that the Dominion Bureau of Statistics has reported national sales of the product. Its appeal to consumers had been due partly to the dietary consideration of lower fat content, and partly to the fact that the price of two per cent is lower than the price of standard milk. The rate of market growth of two per cent sales has been rapid. In Toronto it accounted for 11 per cent of total fluid milk sales in 1958 but for 37 per cent in 1967. In other urban centres the market share of two per cent milk has also grown rapidly; as a proportion of all commercial sales of fluid milk in Canada, two per cent accounted for 15 per cent in 1964 and for 24 per cent in 1967. Regional variation in the relative importance of two per cent sales is considerable. In provinces east of Ontario it was 10 per cent or less in 1967, while in other provinces it ranged from 19 per cent in Saskatchewan to 34 per cent in Ontario.

The incentives to dairies for promotion of two per cent sales are strong. The typical differential of 2 cents per quart between standard and two per cent milk at the retail level is usually less than the return from the

separated cream.* Retail price control in many provinces limits the magnitude of the price differential between standard and two per cent milk, and thus provides the dairies with incentives to increase their proportion of sales of the lower fat milk by other means.

The main consequence of the trend to low fat milk consumption is that it is becoming an increasingly important source of butterfat. At the present time the Dominion Bureau of Statistics treats two per cent as standard milk and converts butter and other butterfat content products to whole milk equivalents in estimating total domestic disappearance of dairy products. In other words, the Bureau overestimates total domestic disappearance. Currently, this over-estimation amounts to over 400 million pounds of milk, but if not corrected, the error will be very much larger in the future.

(iii) Projections of domestic disappearance

Commonly, demand projections are predicated on the assumption of constant prices because of the difficulties of obtaining reliable price forecasts. In this study prices were treated as policy variables, since to a large extent prices of dairy products in recent years have been determined by provincial and federal policies.

As an initial projection it is appropriate to project consumption on the assumption that current policies will continue without significant change. This assumption can be reasonably interpreted as equivalent to maintaining

* Processing costs are normally the same as for 3.5 per cent milk, since the equipment used to standardize the fat content of that product is also suitable for separating cream to prepare two per cent milk. The cost differential between standard and two per cent depends partly on the price of the butterfat in the raw milk and the value of that fat to the dairy. Usually, the price of the fat in the raw milk is lower than its value to the dairy, so that the dairy finds it profitable to use fat rich milk. Another factor contributing to the differential is that the dairy pays the class I price only for the equivalent volume of the two per cent milk produced; the volume corresponding to the separated cream is charged at secondary prices. Commonly the cost differential per quart between standard and two per cent is about 2.5 cents.

constant real prices. The published series on retail prices of fluid milk indicate little variation when allowance is made for increases in the general price level.* Though retail prices of milk are set by milk boards only in some provinces, there is good reason to believe that provincial authorities will continue to set prices at the farm, and in some provinces the retail, level so as to maintain approximately the same real price for fluid milk.**

Similarly in the case of cheese, real retail prices declined from the late 1950's to early 1960's but have not exhibited either a downward or upward trend. The real price of butter has declined due to the stability of nominal price support levels in wholesale markets. The margin between wholesale and retail prices of these products, in real terms, has shown no significant trend. Accordingly, if the federal government were to increase the level of price support in proportion to increases in the general price level, retail prices could be expected to be stabilized at their current levels. Since butter deficits are emerging as a result of the decline in real prices, a policy of stabilizing real prices could be consistent with the avoidance of imports of all products except specialty cheese and with protection of consumer interests, two important aspects of current federal policy.

Projections of per capita consumption of dairy products in 1975 and 1980, based on 1967 real retail prices, are given in Table V.3. All categories of dairy products are projected to decline except cheese, which shows an increase of 61 per cent. Particularly heavy is the reduction in consumption of butter; in fact, butter consumption per capita in 1967 was already less than 17 pounds

* See Appendix V.B for data on real prices and margins.

** Public opinion and the potential threat of substitutes serve to inhibit more rapid rates of price increases. If allowance is made for the preference trend toward two per cent, and for the increasing proportion of store sales and of multiple quart containers, the average real price paid by consumers for milk has not exhibited any significant trend in the past 10 years.

Table V.3. Per Capita and Total Consumption of Dairy Products,
1964-66, 1967, and Projections for 1975 and 1980,
Assuming Constant Real Prices^a.

Per Capita Consumption	1964-66	1967	1975	1980	1980 as % of 1964-66
	- - - - - pounds - - - - -				%
Fluid Milk ^b .	275.0	267.5	246.0	233.0	84.7
Butter	18.5	16.9	14.0	13.1	70.8
Cheese	9.0	9.9	12.8	14.4	161.1
Other Milk Products ^c .	111.4	114.5	102.8	99.6	89.4
Total Consumption in Milk Equivalents	- - - - - millions of pounds - - - - -				%
Fluid Milk ^b .	5,263	5,325	5,703	5,943	115.3
Butter	8,372	7,933	7,773	7,973	95.2
Cheese	1,714	1,971	2,945	3,653	213.1
Other Milk Products	2,178	2,337	2,438	2,594	119.1
Total ^d .	17,230	17,149	17,809	18,831	109.3

^a.Source: Historical data from D.B.S., and project projections.

^b.Includes fluid milk sales and milk consumed on farms; excludes Newfoundland population. Cream included in other milk products.

^c.In milk equivalents.

^d.Adjusted to avoid double counting sales of two per cent milk and the butterfat separated off in preparing the product. Adjustment in terms of millions of pounds of whole milk amounted to: 297 (1964-66), 416 (1967), 1,050 (1975), and 1,332 (1980).

due to higher retail prices. These projections are very similar to those developed by Shefrin et al..^{*} The main differences between the two sets of projections are that the Shefrin study indicates a higher rate of decline for fluid milk^{**} consumption per capita, and an increase in consumption per capita of "other" milk products.

However, the difference between the Shefrin estimates and those made in this study of total consumption in terms of milk equivalents is considerable, mainly because allowance was made in the present study for the growth of two per cent milk sales.^{***} Whereas the Shefrin study indicated a growth in the Canadian market for dairy products of nearly 14 per cent between 1964-66 and 1980, the projections shown in Table V.3 indicate that an increase of slightly more than 9 per cent can be expected in this period, provided that real retail prices are constant and that new substitutes, notably for fluid milk, are not introduced. Since these projections assume a population increase of nearly 33 per cent, the implicit change in per capita consumption of all dairy products in terms of milk is a decline of about 18 per cent.

Demand projections based on alternative policies and prices, are discussed in Section VI.

(iv) Projections of exports and imports

The volume of exports and imports of agricultural commodities is strongly subject to policy decisions in the trading countries, thus making forecasts particularly difficult.

* Frank Shefrin, Z.J. Yankowsky, and J.P. Cavin, Demand-Supply Projections for Canadian Agriculture, 1980, Project No.16, Federal Task Force on Agriculture.

** The Shefrin projection actually is of fluid products, i.e., fluid milk and cream.

*** See Appendix V.C for details of the projections of two per cent milk sales.

Cheddar cheese is Canada's only dairy product export of significance, and even cheddar currently requires an export subsidy equivalent to one-third of its domestic wholesale price. Analysis of the export demand for cheddar (almost entirely in the United Kingdom market) revealed very little response to price changes; indeed, changes in the price of New Zealand cheddar, the major competing product, had a slightly greater effect on Canadian sales in the United Kingdom than did changes in the price of the Canadian product. In recent years cheddar exports have fluctuated between 25 million and 30 million pounds and prospects for a substantial expansion of this market appear dim. A small proportion of cheddar exports is marketed as a specialty product with appropriate packaging and promotion. It is sold in consumer sized packets, under a private brand name, and at a relatively high price. Most exports of cheddar, however, are sold to importers in the United Kingdom, as large rounds. This raw milk Canadian cheddar is regarded by some British consumers as a higher quality product than other cheddars, and commands a premium over New Zealand cheddar, this discriminating public is thought to be relatively small. For many years the question of whether, in the marketing of Canadian cheddar in the United Kingdom, more emphasis should be placed on its premium quality, through such promotional devices as packaging, advertising, etc., has been debated. It seems improbable that the volume of exports could be expanded by this means, though it is possible that higher export earnings could be obtained from a lower export volume through such promotion. At the present time the devaluation of both the British and the New Zealand currencies has greatly increased the rate of subsidization required to maintain exports of Canadian cheddar.

In view of these considerations, and as a preliminary projection, it was assumed that cheddar exports would remain at approximately the same level as in the past four years, namely 350 million pounds in whole milk equivalents or slightly less than 32 million pounds of cheese.

Imported cheeses, which are almost entirely specialty cheeses, have increased during the 1960's roughly in proportion to the growth in total domestic consumption of cheese. In 1967 these cheeses accounted for 11.6 per cent of consumption of all cheeses, and for 48.0 per cent of cheeses other than cheddar and "processed," with which imports compete most directly.

Cheese is imported mainly from Europe, and is subject to a specific duty which for most imports is at the British Preferential or GATT Most Favoured Nation rate of 3 cents per pound, and even under the General rate is only 7 cents per pound. Cheddar and Colby type cheeses are subject to strict import controls which in effect prevent any imports of these cheeses. Many types of European cheeses have begun to be produced in Canada, but the size of such operations typically is small, and many consumers are prepared to pay the premium for European name brands. Thus imports have increased steadily, and unless domestic production is greatly expanded, will continue to increase to 1980. Importations of cheese, which exceeded 23 million pounds in 1967, are projected conservatively to increase to 30 million pounds by 1975 and to 35 million pounds by 1980.

On balance, therefore, it is highly probable that Canada will be a net importer of cheese by 1980, the size of the deficit depending largely on export assistance policies and on the growth of domestic specialty cheese production.

(v) Projected domestic supply

It is obvious that future domestic supply of milk and cream depends largely on market prices and direct subsidies received by dairy producers. Much less obvious, and exceedingly difficult to estimate reliably at the present time, is the future response of producers to different rates of gross returns. Marked differences in the structure of primary production with regard to the size of enterprise, type of farm and location of production, and the rapid changes occurring in this structure make the usefulness of estimates of average supply response

highly questionable. Much of the requisite data at the farm level is not available, or of poor quality, particularly the data on prices. Even such forecasts as might have been made of short-run response to the recent increases in average returns to producers would have been inconsistent with the apparent response to date.*

In the context of changes to 1980 the supply of milk will be strongly influenced by such long-run factors as improvements in the levels of dairy technology, the reduction in total numbers of farmers, and trends toward concentration and larger plants in the processing sector. Within broad price limits the number of dairy producers will continue to decline and the average size of dairy enterprises will continue to increase. Consequently, trends in the primary sector can be used to provide projections of long-run changes in the number and size of dairy enterprises, on the assumption that changes in returns to dairying and alternative opportunities would effect deviations from long-run trends but not reverse them. For this purpose a Markov chain model was applied to Census data on the distribution of dairy herds by size in the years 1956, 1961 and 1966.**

The projections of herd size distributions by region are presented in Table V.4. In all regions the estimated rate of decline in total numbers of herds between 1966 and 1980 is very high, but particularly so in the Atlantic region and in Manitoba and Saskatchewan. In the nation as a whole a reduction of 60 per cent in herd numbers is projected. Regional differences in the rates

*Trant, for example, argued in 1965 that the primary dairy sector had sufficient excess capacity to increase production significantly if prices were favourable, yet despite substantial increases in gross returns in the intervening years, no increase in farm sales has occurred except in Quebec. (See G.I. Trant, Recent Canadian Dairy Price Policies, bulletin, Department of Agricultural Economics, Ontario Agricultural College.)

**For details of the Markov chain technique see G.G. Judge and E.R. Swanson, Markov Chains: Basic Concepts and Suggested Uses in Agricultural Economics, Illinois Agricultural Experiment Station, Research Report AERR-49, 1961. Unlike another recent application of the technique to projection of dairy herd size (I.F. Furniss and Bengt Gustafsson, "Projecting Canadian Dairy Farm Structure Using Markov Processes," Can. J. of Agricultural Economics, Vol.16, No.2.) the rates of change for each herd size were not assumed to be constant.

Table V.4. A Projected Structure of the Primary Sector: The Distribution of Farms Reporting Milk Cows by Herd Size, by Region, 1966, 1975, and 1980^a.

No. of Cows	CANADA				ATLANTIC				QUEBEC			
	1966	1975	1980	Change 1966-80 %	1966	1975	1980	Change 1966-80 %	1966	1975	1980	Change 1966-80 %
3 - 7	55,997	15,650	7,540	-87	5,663	1,550	740	-87	9,193	1,940	780	-92
8 - 12	39,006	11,780	6,490	-83	3,168	1,670	1,160	-63	13,159	3,160	1,380	-90
13 - 17	26,529	11,900	7,710	-71	1,438	1,060	900	-37	12,693	5,770	3,480	-73
18 - 32	38,636	32,110	27,720	-28	1,524	1,280	1,150	-25	18,287	16,990	14,930	-18
33 - 47	10,002	12,590	12,600	+26	368	510	530	+44	3,595	5,220	5,420	+51
over 47	4,231	8,240	10,040	+37	152	280	360	+137	1,002	2,690	3,430	+242
Total	174,381	92,270	72,100	-59	12,313	6,350	4,840	-61	57,929	35,770	29,420	-49
ONTARIO												
3 - 7	8,014	2,230	1,060	-87	7,623	2,590	1,390	-82	13,137	3,300	1,490	-89
8 - 12	9,229	2,640	1,280	-86	3,828	1,350	740	-81	3,743	740	580	-87
13 - 17	7,673	2,590	1,390	-82	1,424	590	360	-75	853			
18 - 32	14,220	10,530	8,880	-38	1,235	780	600	-51	653	430	300	-62
33 - 47	4,610	5,440	5,360	+16	294	340	320	+9	138			
over 47	2,115	3,900	4,650	+120	142	270	340	+139	93	170	250	+169
Total	45,861	27,330	22,600	-51	14,546	5,920	3,750	-74	18,617	4,640	2,620	-86
BRITISH COLUMBIA												
3 - 7	11,416	3,660	1,900	-83	950							
8 - 12	5,560	2,300	1,390	-75	319	520	290	-81				
13 - 17	2,195	1,670	1,430	-35	253							
18 - 32	1,778	1,610	1,510	-15	938	590	430	-54				
33 - 47	495	450	430	-13	502	530	480	-4				
over 47	381	410	440	+15	346	520	570	+50				
Total	21,825	10,100	7,100	-67	3,308	2,160	1,770	-46				
SASKATCHEWAN												
3 - 7												
8 - 12												
13 - 17												
18 - 32												
33 - 47												
over 47												
Total												

^aSource: Census of Canada and project estimates.

of change reflect variations in the initial proportion of small herds and local factors affecting the relative profitability of dairying. The decline is most marked in the herd sizes of 3-7, 8-12, and 13-17 cows, but is apparent in all classes except those with over 47 cows and in the 33-47 cows class in regions east of Saskatchewan. Herd sizes of 1-2 cows are found on farms where milk is produced for consumption in the farm home and any surplus is sold, typically as cream; such farms are not expected to be shipping milk or cream by 1975, and were excluded from the distributions.

Two methods of projecting yields (in terms of milk sales per cow) were considered: extrapolation from historical trends, and subjective assessment of the levels that might be attained in the future. Since the former involves a choice of functional form, it also to this extent is subjective. But the main shortcomings of trend extrapolation are that time series on yields are not available by herd size, and that the quality of the data on milk sales and especially on cow numbers, is poor. Accordingly yields were projected by herd size based on the Canada Department of Agriculture survey data, other data sources on current yield levels in each region, and on the assumption of modest improvements in each class by 1980. The impact of the projected changes in structure on average yields is most marked. Since the higher yields are associated with the larger herd sizes, the projected change in the structure of dairying implies an increase in average yields in nearly all regions to over 8,000 pounds (Table V.5). British Columbia's projected average of 11,700 pounds per cow represents an increase of only 14 per cent over its 1967 average of 10,300 pounds. It should be noted that neither cow numbers nor the yields in 1964-66 are strictly comparable with the 1980 estimates because the former include 1 and 2 cow herds. There were about 70,000 cows in such herds in 1964-66. Nevertheless, the reduction in total cow numbers expected in all regions by 1980 is considerable, and more than offsets the yield increases in many regions.

Table V.5. Projected Changes in Cow Numbers, Yield Levels and Milk Sales
by Region, 1975 and 1980^a.

Region	Cow numbers			Sales per cow			Milk sales		
	1964-66	1975	1980	1964-66	1975	1980	1964-66 ^b	1975	1980
	(000's)			(lbs.)			(million lbs.)		
Atlantic	149	109	100	5,504	7,300	8,000	820	796	800
Quebec	1,047	935	873	5,510	7,300	8,200	5,769	6,826	7,159
Ontario	935	817	776	6,807	8,400	9,200	6,367	6,863	7,139
Manitoba	169	83	68	4,715	7,500	8,200	798	622	558
Saskatchewan	175	45	34	4,114	7,100	7,800	720	320	265
Alberta	260	147	125	5,363	8,300	8,800	1,393	1,220	1,100
British Columbia	86	77	72	9,356	11,100	11,700	805	855	842
CANADA	2,822	2,213	2,048	5,909	7,909	8,722	16,672	17,502	17,863

^aSource: Dominion Bureau of Statistics and project estimates.

^bNo allowance is made in this series for the overestimation of sales in the period 1964-66 due to double counting of two per cent milk.

Only Quebec, Ontario and British Columbia are projected to have higher total milk sales in 1980. In calculating the rate of increase in the national supply of milk, allowance should be made for double counting due to two per cent sales in the base period 1964-66. Relative to the adjusted estimate of sales in that period, the supply is projected to increase by 7 per cent and 9 per cent by 1975 and 1980, respectively. Nearly all the increase is attributed to the Central Provinces, and substantial declines are projected to occur in the Prairies, especially Saskatchewan. These declines are consistent with the reduction and anticipated eventual disappearance of cream shipping.

In general, these estimates may be regarded as indicative of the upper limit on supply growth which can reasonably be expected. Projected herd numbers are more likely to err on the side of overestimation, and the projected yields imply a considerably more rapid rate of improvement in provincial averages than has occurred in the past.

(vi) A projected balance sheet for 1975 and 1980

The estimates discussed above together provide an indication of the future demand-supply balance for milk on the assumption that current policies and past trends continue. In this sense the estimates show the probable outcome of maintaining present dairy policies. Such a balance sheet for 1975 and 1980 is presented in Table V.6.

There are two items in this balance sheet which could be readily misinterpreted. 'Exports' in the period 1964-66 include government stock disposal abroad; since nearly all exports have moved under some form of government assistance, there is no unambiguous means of separating such disposal of stocks. 'Net balance' in the historical period represents the decline in stocks. In projecting exports no provision was made for government subsidization of commodities other

Table V.c. A Balance Sheet for Dairy Products in Terms of Milk,
1964-66, 1967, 1975 and 1980^a.

	1964-66	1967	1975	1980	1980 as % of 1964-66 %
	- - - - -	millions of pounds	- - - - -		
1. Total domestic dis- appearance ^b .	17,230	17,149	17,809	18,831	109.3
2. Used in farm homes ^c .	974	917	660	540	55.4
3. Commercial domestic disappearance (1.-2.)	16,256	16,232	17,149	18,291	112.5
4. Total sales off farms ^b .	16,375	16,270	17,502	17,863	109.1
5. Imports	188	260	330	385	204.8
6. Exports	820	357	350	350	42.7
7. Net imports (5.-6.)	-632	-97	-20	+35	-
8. Total domestic supply excluding stocks (4.+7.)	15,743	16,173	17,482	17,898	113.7
9. Net balance (3.-8.)	+513	+59	-333	+393	-

^aSource: Tables V.3, V.5, and other project estimates.

^bAdjusted to avoid double counting due to two per cent milk sales.

^cProjections derived by extrapolation of historical trends.

than cheddar, on the premise that this was the only dairy export which in any sense could be considered commercial, and which consequently could be projected meaningfully. Thus in 1975 and 1980 the net balance represents the estimated deficit (+) or surplus (-) of dairy products assuming, inter alia, cheddar exports amounting to 350 million pounds in milk equivalents.

The projected balance between domestic supply and domestic disappearance should not be interpreted too literally. What it indicates is that this balance will continue to be close, and that the recent reduction in surpluses should not be regarded as a trend leading to a stable deficit situation if current policies are maintained. The main purpose of this balance sheet, however, is not as a forecast of the future supply-demand situation for dairy products, but as a reference for comparison of alternative policies.

These projections are all expressed in terms of the equivalent of milk of 3.5 per cent butterfat, and account for skim milk products only to the extent that they include the whole milk equivalent of the butterfat complement to skim milk. The corresponding supply-demand balance for skim milk products is shown in Table V.7. The shift from cream to milk shipping is projected to be complete by 1980. The result of this shift is to increase the supply of skim milk more rapidly than it can be absorbed in the domestic market at the price levels which have prevailed in recent years. Consequently, a large surplus of skim milk can be expected to persist throughout the 1970's and this surplus will only decline in the 1980's when the domestic market will expand more rapidly than the supply of skim milk.

Table V.7. Production and Consumption of Skim Milk Products, 1966, 1967 and Projections for 1975 and 1980^a.

Skim Milk Products in Terms of Skim Milk Powder ^b	1966	1967	1975	1980
	- - - - -	millions of pounds	- - - - -	- - - - -
1. Production	355	377	465	581
2. Domestic disappearance	192	176	304	347
3. Surplus (1.-2.)	163	201	161	234
4. Net exports	130	123		
5. Stock accumulation	33	78		

^a. Source: Dominion Bureau of Statistics and project projections.
Projection method: production = skim milk powder complement of domestic disappearance of butterfat excluding butterfat from two per cent milk; domestic disappearance = estimated consumption of skim milk powder at constant real prices from demand equation (Table V.1) plus assumed domestic market of 80 million pounds for other skim milk products.

^b. Evaporated and condensed skim milk, casein and skim milk powder.

VI. ALTERNATIVE DAIRY INDUSTRY POLICIES

(1) Current dairy policy problems -- a synopsis

Put most simply, the main problems of the dairy industry stem from the attempt through government policies to protect and maintain a type of agricultural production in which Canada has a marked comparative disadvantage. Primary dairy production in Canada is, for the most part, characterized by high and rising costs. Excepting those small scale producers who have low opportunity costs, and large scale producers, predominantly fluid shippers, who have attained substantial economies of size, the majority of producers would not be able to cover their operating costs and obtain a return on their labour and equity if federal subsidies were significantly reduced. In such an event many producers who derive a large part of their income from dairying would face income problems, varying in severity and duration with their farm and off-farm alternatives.

To a lesser degree, firms in the processing-distributing sector are facing similar problems, in that many small output, low-efficiency, plants have experienced increases in raw material and labour costs which have not been offset by higher selling prices. Both sectors are characterized by wide disparities in levels of technology and average costs.

The concern of dairy industry spokesmen in recent years has arisen out of an interaction of rising input prices, changing technology, accelerated attrition in the number of primary producers, processors, and distributors, and increased concentration and competition in processing and distribution.

Primary producers have sought and obtained additional federal subsidization to improve their incomes. As a consequence the federal treasury costs of support programmes for manufacturing milk and cream currently amount to \$130 million per annum, and the consumer costs exceed \$100 million. Yet notwithstanding these large outlays there is no prospect of substantially improving incomes from dairying

or reducing the costs of support if present policies are maintained. Indeed, the present high prices of dairy products provide incentives for the introduction of substitutes which would erode the markets for dairy products.

In brief, the choice before the federal government is to continue a dairy policy which does little to improve the income of poor farmers or the efficiency of the dairy industry, and which incurs large treasury and consumer costs, or to adopt an alternative policy which would lower average production costs, and reduce support costs, consistent with adequate provision for the welfare of low-income farm families.

Politically, the federal government, through creation of the Canadian Dairy Commission and through public statements on dairy policy, has committed itself to assist the industry, while respecting the interests of other groups, specifically consumers. But it has not yet committed itself to any long-run policy. It is the lack of definition and the consequent fluidity of existing federal dairy policy which provides the best hope for changes in policy.

(ii) Policy alternatives

Any policy can be evaluated, once its objectives are clear, in terms of the direct costs to taxpayers and consumers, the indirect costs borne by the economy due to poorer allocation of resources or reduced advantage in international trade, the extent to which the objectives actually are attained, and its probable duration. The objectives of the policy can be assessed also, in terms of their clarity, consistency or conflict with other policy objectives, etc. But insofar as policies typically are formulated through a process of compromise among competing objectives, it is the politician, not the economist, who must assess the relative importance of the objectives, decide on the appropriate compromise, and bear the responsibility for the consequences.

Unfortunately, a solution to the problem of the present dairy policy inescapably involves a far clearer statement of long-run objectives than post-war governments have elected to make, and we must outline those objectives which seem most relevant. The attempt to create a manufacturing milk sector capable of eventually meeting domestic requirements without high direct or indirect costs must be ruled out as infeasible. The alternatives essentially involve a choice between the size of the industry and the total costs deemed consistent with the national interest. In our view, there is little sense in choosing as a goal a permanently subsidized industry. The choices should revolve about the schedule for achieving a fully competitive dairy industry, recognizing that major adjustments in both primary and processing sectors will be required. Two rates of progression towards such a goal are to be considered: one intended to remove all subsidies and import restrictions by 1980, the second involving a more modest rate of adjustment.

There are other policy alternatives. Some would argue for a prompt termination of all government assistance to the industry. Representatives of dairy producers, by contrast, periodically urge that federal assistance programmes should be expanded still further. Neither approach appears to have political or economic merit. The very size of the industry militates against jeopardizing it by discontinuing all dairy subsidies,* and the political repercussions of such an abandonment of government responsibility would be far greater than the political importance of the dairy industry alone. At the same time there are no cogent reasons for maintaining, let alone expanding, the present high rate of assistance.

* Farm receipts from dairying amounting to about \$440 million and value added in dairy factories amounting to some \$150 million would be affected directly; about \$340 million of sales of other industries to the dairy industry would be indirectly affected, and the full indirect effects would be much greater. (Rough calculation of the sales of other industries most immediately affected derived from input-output coefficients applied to 1967 data. See T. Josling and G.I. Trant, Interdependence Among Agriculture and Other Sectors of the Canadian Economy, Agricultural Economics Research Council of Canada, Publication No.2.)

Two decades of protectionism have not improved the competitive position of Canadian dairy producers, and there is no rational reason for continuing to assure producers of virtually exclusive rights to the domestic market. Even if continued at the current rate of assistance, the present value of treasury expenditure on dairy programmes over the next decade would exceed one billion dollars.* The burden of support programmes on consumers is already high and regressive in its incidence; if increased, it would accelerate the introduction of substitutes and the erosion of dairy product markets. Finally, if present assistance to dairying is expanded, it will become even more difficult politically to deny quid pro quo arguments by other agricultural producers, and to prevent escalation of general assistance to agriculture and the deterioration of its competitive position.

(iii) Programme alternatives

It is trivially true, but perhaps necessary to emphasize, that there are an infinite number of alternatives to present dairy programmes. We hope only to have considered those which, because they have been proposed often or because they provide prospect of solution to policy problems, are the most important. Consideration is given to a number of programmes which could be incorporated in a comprehensive overhaul of present policy, and which deal successively with (a) dairy farmers in poverty, (b) structural rationalization of dairying, (c) the pricing of milk at the margin, (d) the processing-distribution sector, (e) dairy substitutes.

(a) Programmes for dairy farmers in poverty. To the extent that dairy programmes have been implemented to improve the incomes of many poor farmers, current subsidies, which are proportional to market sales, are an indirect and inefficient means of dealing with the problem of rural poverty. As noted earlier in this study, low income farmers are much less closely associated with dairying

* The capitalized value of \$130 million annual expenditure over 10 years, discounted at 6 per cent, is \$1,014 million.

than they used to be, and the Dairy Commission now places little emphasis on poverty problems as a rationale for its policy. Nevertheless, a significant proportion of dairy producers would face serious income problems without present subsidies.

These considerations provide grounds for a direct approach to the problem of low-income producers. This could take the form of payments based on family income deficiencies in relation to some minimum family income standard, or the form of payments for retraining and transfer to more remunerative occupations, or payments for area redevelopment.

However, this approach could not be justifiably applied to resolve the poverty problems of dairy producers alone, nor yet of farmers alone. A general minimum income policy, once introduced, would obviate the need for most special assistance to agriculture. Within the scope of this study we can only stress the importance of recognizing this fact in the formulation of general agricultural and economic policies, and the inappropriateness of dealing with poverty problems by means of dairy programmes.

(b) Structural rationalization programmes. The *raison d'être* of the Dairy Commission's policy is now centred on transforming the primary dairy sector into a structure composed of units large enough to warrant investment in specialized equipment, housing and livestock and thus to attain economies of size in production. Many suggestions have been made regarding the appropriate measures to attain this objective.

Capital grants and loans. Seemingly the most direct means of transforming dairy enterprises into economic units is a system of capital grants, or possibly interest free loans, to finance the necessary investment. These might be allocated to farmers on the basis of the submission of an approved plan which would provide

technical details and anticipated costs and returns of the enlargement. Presumably participating farmers would be expected to compete without need of direct payments.

There are three kinds of objections to this proposal. First, it would appear to duplicate, and even conflict with, existing farm credit policies, and inequitably give special credit privileges to dairy producers. If there is a basis for a credit policy for agriculture, both equity and efficient resource allocation within agriculture dictate that the policy apply equally to all types of producers. Second, if the enlarged dairy enterprises were able to compete only because of the low cost of their investment, then obviously the programme would merely defer current problems to a later date, and morally commit future governments to extricate farmers from difficulties created by these capital subsidies. Third, if the enlarged dairy enterprises could earn a market rate of return on the investment, then there would be no grounds for subsidizing the cost of the investment, but only for ensuring that imperfections in the credit market did not discriminatorily restrict loans to any kind of farmer.

Proposals for a special capital grant or free loan programme for dairy farmers are completely unsound.

Promotion of alternative farm enterprises. The high treasury costs of supporting a type of enterprise in which Canada has a serious comparative disadvantage has led to suggestions that solutions to dairy policy problems lie in the promotion of other farm production for which relative costs are more favourable. In the Prairies beef, hog, and grain production provide good alternative enterprises in most areas, but in Eastern Ontario, Quebec and part of the Maritimes the choices are less obvious. No attempt has been made to evaluate all the regional alternatives. Instead, the general argument that the federal government should attempt

to raise effective opportunity costs for dairy producers and thus encourage the less efficient shippers to switch to other enterprises will be examined, and illustrated with one example.

The crux of this argument is the interpretation of the phrase 'encourage' or 'promote' alternative enterprises. If the proposal is for the federal government to undertake research, to disseminate information on the results, and to work with provincial governments to ensure, through extension services, that farmers are fully aware of the alternatives open to them, then the proposal only stresses the importance of these government services being fully relevant to farmers' problems. There can be no serious disagreement with such a recommendation. However, if the proposal is interpreted to mean that funds presently being allocated to dairy programmes should be expended on subsidization of alternative enterprises, it is difficult to justify. If the net returns to some resources in dairying are higher in other enterprises despite dairy subsidies, resources will undoubtedly be transferred into those enterprises, and in fact such a movement has occurred in many regions in recent years. Undoubtedly at lower rates of subsidization more resources would be allocated to uses other than dairying. But there is no gain to encouraging such resource shifts by subsidizing the net returns to non-dairy enterprises, and thus promoting further malallocation of resources. Unless a production subsidy is less than the transfer payments which would be required to raise the incomes of the owners of the resources up to an acceptable minimum income level, there are no economic grounds for introducing the subsidy. And since agricultural subsidies tend to be paid equally to all producers of a given type, regardless of their opportunity costs, production subsidies commonly exceed income deficiency transfer payments in treasury cost, and/or fail to raise the incomes of the poorest recipients to an acceptable minimum.

Heighton, in a recent article, has suggested that manufacturing milk shippers in Eastern Ontario are potentially capable of greatly expanding corn production in that region to meet the starch and distillery demand for corn, at present supplied mostly by imports from the United States.* It has been suggested by others that corn production might prove a suitable alternative to dairying in Western Quebec as well as Eastern Ontario. Heighton showed that corn could be a profitable crop in Eastern Ontario, and because it is a deficit area, average prices for cash corn were higher than in Western Ontario and more than offset differences in production costs. He estimated that some 266 thousand acres of land was of good potential for corn production compared with a present acreage of about 10,000. Not considered by Heighton were the net returns to other grains in Eastern Ontario, nor the corn prices and average costs which might prevail if corn acreage were expanded. Certainly if production were increased substantially, prices would fall, and it is probable that as less competent producers start growing corn** and as additional land is brought into corn cultivation, production costs would rise. But assuming that corn production could be profitably expanded in Eastern Ontario, and recognizing that the additional corn likely would be fed to livestock on farms in the region as local corn prices declined, what are the implications for dairy policy? At best, livestock output, including milk, would increase in the region and the incomes of present dairy farmers who began growing corn would improve.*** But corn production does not appear to be a panacea to the problems of Eastern Ontario dairymen, nor are there sound reasons why the federal government, through subsidies, should make it so.

* V.A. Heighton, "The Grain Corn Enterprise in Eastern Ontario, 1967," Canadian Farm Economics, June 1968.

** Heighton's cost data were based on farm management account records which would be representative of the more progressive farmers.

*** A possible parallel to the future of corn and livestock production in Eastern Ontario is the experience of Oxford county in Western Ontario. About 15 years ago Oxford county also had a major dependency on manufacturing milk and good opportunities for expanding grain corn production. Since then grain corn acreage has expanded fivefold, total milk cows increased from 40,000 to 50,000 head, while other forms of livestock production increased even more. Dairy is still the predominant type of commercial farm in Oxford county.

Negotiable subsidy eligibility quotas. The issue of making the Dairy Commission quotas negotiable has been fully discussed [see Section II (i)] and our conclusion is clear, namely, if quotas are to be maintained, open negotiability should be permitted. Quota negotiability will facilitate adjustment, but, of course, without other changes, the high costs of dairy subsidies will persist, and the distribution of subsidies will shift more rapidly to the larger shippers, thus accentuating concern about large direct subsidies being paid to operators of relatively large farm businesses. At present, quota transfers are contingent on two farmers getting together and agreeing to transfer a herd and the concomitant quota from one to the other. An open quota market would permit interregional transfers. Shippers with the lowest opportunity costs of milk production, large shippers and shippers in Quebec and Ontario, would seek to buy quota, while producers in the Maritimes and especially in most parts of the Prairies, and those in the 50,000 to 150,000 pounds class, predominantly would be the sellers.

Progressively lower direct payments. Apparently the Dairy Commission regards direct payments as a means of encouraging structural rationalization, and envisages eventual attainment of a dairy structure which does not require such subsidies. The relevant questions to raise about this programme are the manner and timing of its termination. One approach, suggested by recent programme changes, is to progressively raise the cut-off level for eligibility from the existing 12,000 pound limit until no producers are eligible. While administratively simple, this procedure would be completely arbitrary. Its justification would require the assumption that the Commission's determination of the returns which should be received by different producers was more appropriate than the returns resulting from market forces. (Such forces would be evident, for example, in an open quota market.) The present direct payments programme is subject to this criticism; there seems to be no reason for extending it.

Another method of phasing the programme out is to reduce the value of the unit payment each year. Sooner or later this must be done, but by itself such a change would be too negative to be well received by producers, in which case it likely would be politically unfeasible.

Establish milk shipping pools. Much of the agitation on the part of manufacturing milk and cream shippers for higher prices has been stimulated by comparisons between their prices and the prices received by fluid milk shippers. The apparent inequity of this situation, and the apparent inconsistency of double quality standards for fluid and manufacturing milk, has prompted several writers to urge a uniform standard of quality for all milk and a blend price for milk f.o.b. the receiving plant.* Presumably price pooling would be introduced on a regional basis to minimize problems for fluid shippers whose average prices would be reduced by additional shippers. A proposal for eventually complete regional price pooling has considerable appeal because of the removal of existing inequities and the improvement in incomes which could be attained for current manufacturing shippers through a share of the higher priced fluid market, instead of through direct subsidies.

The difficulties of implementing such a proposal are immense. It would require a very high degree of co-operation between the Dairy Commission and provincial milk authorities, who in most provinces are little concerned about non-fluid shippers. Nor is the scheme quite as attractive as it might at first appear because (1) there are additional costs incurred in raising the quality of milk produced by manufacturing shippers (even by the larger, year round shippers) to meet fluid milk standards,** and (2) the same quality standards are not required for milk which is to be processed as for milk which is to be consumed as such. Consequently, even if manufacturing shippers were given access to a pool, not all would elect to

* For example, G.I. Trant, Recent Canadian Dairy Price Policies, bulletin, Department of Agricultural Economics, Ontario Agricultural College, 1965; Wm. Mackenzie, The Canadian Dairy Industry, Agricultural and Rural Development Act project #15033, 1967.

** See Section I (vi).

participate in it. In Ontario, for example, where manufacturing shippers were recently given the opportunity of entering the fluid pool, only some 800 producers applied out of a total of over 18,000.* To legislate grade A standards for producers who are not interested in shipping to fluid markets would unnecessarily increase production costs.

However, the principles of pooling among shippers who attain a common standard of milk quality, and of providing access to the higher price pool should be implemented on the basis of both equity and the removal of distortions in resource use attributable to market imperfections. The Dairy Commission's programmes should facilitate fulfilment of these principles, and the Commission should encourage provincial boards in the course of consultation with them to establish uniform standards for fluid and for processing milk and to create price pools.

Compensation payments to induce withdrawal. If the present direct payments programme serves to retard the rate of withdrawal out of dairy production, it appears logical to encourage producers to quit by offering a lump sum payment to those who stop shipping milk. A uniform payment to any manufacturing milk and cream shippers would ensure that the least efficient had the most incentive to withdraw. Alternatively, the payment could be made proportional to the direct payments received in the past; for example, the compensation offered might equal the capitalized value of the payment received over the next three years, appropriately discounted.** As producers went out of production, total milk and cream sales would decline and market prices would tend to rise above support levels, thus reducing or eliminating export subsidization expenditures. In fact the Dairy Commission has paid compensation to those producers with shipments in 1967-68 below 12,000 pounds of milk who were eliminated from participation in the direct subsidy programme.

* Of these, only 475 were qualified to participate because of milk quality standards, requisite physical facilities, and ability to meet year round production requirements. No doubt more will apply and qualify as the benefits of the pool and the entry standards become better known.

** If the discount rate were 6 per cent, the compensation payment to a shipper who had received \$500 in direct payments would be \$1,417.

Arguments might be raised about the wisdom of paying farmers for not shipping milk. Another criticism might be the implied reversal of the Dairy Commission's policy. But these criticisms are substantially blunted by the fact that the government has committed itself to assist the primary dairy sector, and specifically to rationalize the structure. In conjunction with other programme changes, compensation programmes could contribute importantly to these objectives while also lowering the cost of attaining them over the next few years.

(c) The pricing of milk at the margin. The inadvisability of increasing prices of dairy products to consumers has been made plain, but the appropriate price support policy remains to be discussed. Both the level of prices for milk and the relative pricing of the butterfat and solids-not-fat components are pertinent.

The current surpluses of skim milk powder and emerging butter deficits might prompt suggestions to lower the skim milk powder price and raise the price of butter. The Dairy Commission through its direct payments programme marginally applied such reasoning this year. However, unless self-sufficiency is the cornerstone of dairy policy there is little merit to this argument. Its implementation would add to the incentives for substitutes, and, because of the relative price elasticities, it would lower total expenditures on dairy products.*

The alternative of lowering butterfat prices and raising prices for solids-not-fat would, of course, accentuate the present imbalance between domestic utilization and production of these milk components. The Canadian Dairy Commission could import butter to meet the deficit and use the difference between the import price and the domestic price to finance its support programme. Conceivably it

* For example, if the price of butter were raised 10 per cent, the price of skim milk powder would have to be lowered by nearly 16 per cent to maintain the same price of milk. With price elasticities of -1.2 for butter and -.3 for skim milk powder, expenditure on the former would decline by 3 per cent and expenditure on the latter would decline by 12 per cent.

might finance the export subsidies with revenue from butter imports!*

But it would be more consistent with a long-term dairy policy designed to make the industry competitive to lower the prices of both the butterfat and the solids-not-fat. Such a reduction should be introduced gradually to facilitate adjustment on the part of processors and primary producers, and to maintain a stabilizing floor price. Maintenance of constant nominal price support levels would result in real prices declining slowly. Canadian prices for dairy products could be expected to move toward world prices. Export subsidies might still be necessary to dispose of surplus non-fat milk solids in the form of skim powder and casein, but the subsidy per unit would decline.

Whether export subsidization of cheddar cheese should be continued is doubtful in view of the poor prospects for growth of cheddar sales in the British market. As Canada moves toward a net deficit position in dairy products trade, the rationale for subsidizing 30 million pounds of cheddar exports each year will vanish. An alternative to the cheddar programme is to promote the development of specialty cheese production in Canada. Superficially at least, the prospects for an expanded specialty cheese sector are good: the demand for such cheeses is strong and will continue to grow rapidly, and some specialty cheese are already produced domestically. We do not suggest another subsidy programme, but rather a thorough investigation into the feasibility of expanding specialty cheese production, and then, if appropriate, promoting it.

(d) The processing-distributing sector. The impact of federal dairy policy on milk processors and distributors includes the effects of price support programmes on margins, and the effects of dairy programmes on milk and cream supplies.

* A reduction in the butter support price from 63 to 57 cents and an increase in the powder support price from 20 to 23 cents would yield the same price for whole milk. Demand for butter would rise by about 12 per cent, production might decline by 3 per cent, so that about 50 million pounds would have to be imported on which the Commission could realize \$7.5 million. Even if the surplus of solids-not-fat in terms of powder rose by 20 per cent, or from 201 million to 241 million pounds, the Commission could finance all its surplus disposal programme out of its import revenue.

To the extent that changes in federal policies have had a destabilizing effect on trends in milk and cream supplies, some processors have experienced difficulties, and all are faced with uncertainties in planning investment in plants and equipment. Processors, like primary producers, stand to gain by an unequivocal statement of long-run dairy policy.

Seasonal stabilization of prices has accentuated seasonal instability of milk and cream production and thereby added to processing costs. If the Canadian Dairy Commission's objective of large economic-sized dairy enterprises is realized, seasonal variation in production will become much less marked; average processing costs will tend to decline as the annual output of plants rises toward their annual capacity output. The Commission should not attempt to determine manufacturing milk prices to producers, even by indicating the prices which provincial agencies should expect to obtain for shippers. Implicitly this is an attempt to set processing margins, which is unlikely to succeed equally among regions (and thus lead to distortions in interregional competition). It would be preferable to let margins be determined by competitive forces, not by administration.

(e) Dairy substitutes. Policy toward substitutes for dairy products is largely a provincial matter. Its importance serves to draw attention to the interrelations among federal and provincial dairy policies, and to the need for full co-operation among all these jurisdictions in the formulation and administration of policies. The federal government has an important but secondary role to play as a co-ordinator on these matters. Direct federal involvement in dairy substitutes policy will probably be limited to prescription of nutritional standards, and possibly imposition of excise taxes on certain products or import duties on some constituents.

The best strategy against new substitutes, notably those for fluid milk, will be to offer consumers dairy products at competitive prices and of high quality. Arguing by analogy to reconstituted and other all-dairy milks, there appears to be a strong argument for continuing to prohibit filled milk, or to price its dairy component at class I levels. The same is not true of synthetic milk and undoubtedly once the flavour and nutritional problems of this product have been overcome it will prove difficult to prevent its introduction. The inroads which might be made by substitute milks will depend largely on pricing of fluid milk. The lower the rate of increase in producer prices, and the greater the stimulation of competition among distributors, the less will be the impact of substitutes. Producers and provincial boards must realize that present pricing will be a major determinant of the future size of the market. Again, any attempts to determine retail prices administratively will militate against competition in the fluid milk trade and favour substitutes.

(iv) Policy Recommendations

Formulation of a clear long-run policy for the dairy industry is imperative. In our view, that policy should have as its major objective the development of a competitive dairy industry, through the gradual liberalization of trade and the progressive removal of subsidies, consistent with proper compensation for existing producers of milk and cream for manufacturing use. Further, policy for the dairy industry should be integrated with policy for agriculture as a whole. It is appropriate to outline the programmes recommended to achieve these objectives, but the rate of progression depends partly on political considerations and on future developments in the industry, about which forecasting can be neither reliable, nor in consequence, useful to policymakers. However, as a basis for assessment of the policy proposed, projections are presented of the supply-demand balance on the alternative assumptions of complete and of partial attainment of the objectives by 1980.

Policy for farmers in poverty, though of great urgency, is not properly implemented through dairy programmes, and in many regions solutions to the problem require much broader programmes than the responsibilities of the Canada Department of Agriculture alone would warrant. Accordingly, we have not made specific programme recommendations for dairy farmers facing serious low-income problems, although in the course of this study we have attempted an assessment of their number and predominant location.

Programme recommendations

1. Direct payments. Existing holders of subsidy eligibility quotas should be offered a cash payment in compensation for relinquishing their quota privileges. The rate of compensation might appropriately equal the present value of the payment made in 1968-69 over the next three years, discounted at 6 per cent. The offer might be made available for two years.

Remaining quotas should be made openly negotiable, subject to the restriction that any producer shipping less than his quota will have his quota holding automatically reduced to the level of his shipments in that year.

The unit value of the direct payments should be progressively reduced. Since inflation will reduce the real value of the unit payment, the nominal value can be reduced slowly. To avoid any speculation and to facilitate production planning, the nominal value of the unit payment should be announced five years in advance.

2. Market price supports. The level of support of prices for butter, skim milk powder, and cheddar cheese should be reduced gradually. The rate of reduction required in nominal terms will be modest as inflation lowers the real level of support.

Export subsidies on cheddar cheese will decline with constant nominal price support levels, but the possibility of replacing this programme with one designed to develop the domestic specialty cheese sector should be carefully investigated.

3. Processing margins. Increased efficiency in processing and distribution of dairy products should be encouraged. Specifically, the federal government should not attempt to set margins for processors by announcing a farm price of whole milk estimated to correspond to the support levels of dairy products.

4. Federal-Provincial co-operation. Responsibility for dairy policy cannot be compartmentalized precisely among federal and provincial jurisdictions. The required co-operation among government agencies responsible for dairy policies includes consultation on policy formulation, consistency among programmes, and removal of its inequities arising out of discrimination between fluid and other milk shippers. In the latter regard, provincial governments should undertake to establish regional price pools for grade A milk and provide non-fluid shippers with the opportunity of entry into such pools. The federal government should encourage such provincial programmes, not create disincentives for entry. Specifically, in regions where pools exist shippers should be permitted to hold direct payment quotas and receive payments on all shipments in excess of 125 per cent of their sales at class I prices. Manufacturing milk shippers transferring into the pool under this programme would be permitted to continue receiving direct payments on their federal quota subject to the same restrictions as other fluid shippers, and all fluid shippers would be permitted to purchase federal quota.

It would be desirable if all programmes to determine retail prices for dairy products were discontinued, excepting prohibition of the retail sale of fluid milk below cost. Provincial governments have an important part to play in stimulating competition in processing and distribution.

Any recommendations with regard to dairy substitutes are contingent on interpretation by the courts of substitute legislation, and on public support for such legislation. In our view, the best strategy against erosion of dairy product markets by substitutes is through competition. It must be recognized that the pricing of fluid milk will be a major determinant of the future introduction and market growth of substitute milks. In the interest only of consumer health, fluid milk substitutes should be required to be nutritionally equivalent to dairy milk.

Policy planning and administration

The dual functions of policy development and programme administration at present undertaken by the Canadian Dairy Commission should be the responsibilities of separate government agencies. The Commission should continue to be responsible for programme administration and could make an important contribution to the development of dairy policy. The main responsibility for policy planning, however, should be discharged by another agency, such as the Economics Branch of the Canada Department of Agriculture. Such a separation of responsibilities is essential to the development of a sound dairy policy. Policy planning, properly undertaken, should include rigorous analysis of the problems which provide the rationale for the policy, regular evaluation of the programmes, and the formulation of programme changes. In the immediate years ahead these tasks will require about two man-years of experienced professional time annually.

Data deficiencies

At various points in this study we have found it necessary to comment on the inadequacies and inaccuracies of available data on the dairy industry. In view of the very large treasury expenditures on dairy programmes and the importance of the dairy industry, the quality of published dairy statistics is disgracefully poor.

Some kinds of data, crucial to appropriate policy formulation, are not available. In particular we are concerned that only estimates for the most summary aggregates on net farm income are available, so that the present distribution of net farm income and of total family income of farmers, including dairy farmers, is completely unknown. Patently in the interest of policy for all sectors of agriculture these data deficiencies must be overcome. Statistical information obtained in the course of administration of dairy programmes, improved monthly surveys, and complete linking of the Censuses of Population and Agriculture can contribute to data improvement.

(v) Projections toward rationalization

The evolution of an unsubsidized and prosperous Canadian dairy industry will depend considerably on the encouragement given for structural adjustment through changes in dairy programmes. An unequivocal statement of long-run policy goals and an explicit statement on the long-run plans for the direct payments programme would do much to stimulate adjustment by removing major sources of uncertainty.

We assume that the direct payments programme will be phased out by 1980. Changes in market price support programmes, however, might be expected to be more gradual. We consider two rates of progression towards removal of all price supports for manufacturing dairy products, assuming (1) maintenance of present nominal price support levels, and (2) removal of all supports by 1980. In both projections it is assumed that real prices for fluid milk will be constant. Cheese prices are little above the unrestricted import price level, and are projected here to reach that level by 1975.* The demand projections are shown in Table VI.1.

* Even so, the 1980 per capita consumption of cheese (15.8 pounds) is probably too high; 14 pounds appears likely to be a saturation level for cheese consumption in North America.

Table VI.1. Per Capita and Total Consumption of Dairy Products,
Projections for 1975 and 1980, Assuming Declining Real Prices^a.

	Assuming maintenance of support prices at present nominal levels		Assuming removal of all price supports by 1980	
	1975	1980	1975	1980
	----- pounds -----			
Per capita consumption				
Fluid milk ^b .	246.0	233.0	246.0	233.0
Butter	17.0	17.5	17.7	18.2
Cheese	14.0	15.8	14.0	15.8
Other Milk Products ^c .	96.4	90.4	95.0	88.4
Total consumption in milk equivalents	----- millions of pounds -----			
Fluid milk ^b .	5,703	5,943	5,703	5,943
Butter	9,432	10,667	9,820	11,094
Cheese	3,223	3,997	3,223	3,997
Other Milk Products	2,286	2,355	2,252	2,303
Total ^d .	19,594	21,630	19,949	22,005

a,b,c,d. See Table V.3.

The reduction in the total supply of milk in response to lower real prices is difficult to predict. If support prices remained at their present nominal levels, the farm price for manufacturing milk would decline to about \$2.65 by 1975 and \$2.30 by 1980 measured in terms of 1967 dollar values. At such a price in 1975 few producers shipping less than 240,000 pounds could be expected to be covering their costs; that is, a 30-cow herd would tend to be the minimum size of manufacturing milk enterprise. By 1980 even such a herd size would be uneconomic, and available information on production costs provides little basis for suggesting the minimum size of enterprise, especially since changes in production techniques will alter the costs of the largest dairy enterprises substantially. But it is clear that only the largest shippers would find production

profitable at these prices. Based on the herd size distributions projected from recent trends (Table V.4) and assuming 33 cows as the minimum herd size, the total number of dairy farms in 1980 suggested by these policy changes is about 23 thousand. Probably the majority of these producers would be fluid shippers. The supply of milk in 1980 corresponding to these shippers would be 10.5-11.5 billion pounds, rather than the 17.9 billion pounds projected from recent trends (Table V.5). A supply of this magnitude would be consistent with a dairy industry oriented only toward the domestic market for fluid milk, cheese, and some "other milk" products, notably ice cream. Imports would account for the balance of domestic consumption, and would include all butter requirements, and 10-20 per cent of total cheese consumption, depending on the growth of Canadian specialty cheese processing. It should be noted that such a balance between domestic demand and supply would not generate surpluses of skim milk solids.

The recommended controlled progression towards liberalization of trade would require the Dairy Commission to import butter as the domestic butter deficit develops. If support prices were maintained at present nominal levels, prices could be expected still to be 5-10 per cent above present world market levels in 1980. It could be argued that the transformation of Canada from a net exporter to a net importer of dairy products would raise world prices. However, recent F.A.O. projections of the development of the world market for dairy products indicate growing surplus problems in the 1970's.* A more rapid rate of adjustment would be necessary, of course, to remove dairy price supports completely by 1980, but the adjustments would not differ in kind nor greatly in degree.

Implementation of the recommendations of this report would lead eventually to a primary dairy sector comprising only fluid milk shippers and to a processing sector based solely on processing of milk surplus to fluid requirements. The fluid milk segment is clearly the only foundation for a viable dairy industry in Canada. The present projections assume fluid milk price policies and other policies which avoid any inroads by new substitutes. It is to be hoped that such policies are actually implemented.

* Agricultural Commodities - Projections for 1975 and 1985, Volume I, Food and Agriculture Organization, CCP67/3.

Appendix II.A

The Apparent Lack of Supply Response to Recent Increases in Returns to Dairying -- An Explanation

The absence of any expansion in milk supply in response to the recent increase in producer returns has perplexed many observers. The average national increase in market prices between 1965 and 1967 was about 13 per cent, but in Quebec and some other provinces the increase was less, and in New Brunswick and Saskatchewan the average price actually declined. Nevertheless, the large direct payments, initially unlimited by quota, might have been expected to stimulate milk supplies. No single factor can be adduced to rationalize the apparent lack of supply response. Undoubtedly favourable prices for alternative products such as beef, hogs, and wheat, and increasing dissatisfaction among farmers with the daily labour demands of the dairy enterprise, have served to minimize the response. Significantly, milk sales in Quebec, where the alternatives to dairying are least attractive, did increase by over 10 per cent from 1965 to 1967. It is also clear that structural change has partly masked the supply response. Declines in the numbers of small shippers and growth in the shipments of large producers, have tended to have offsetting effects on total supply. The shift from cream to milk shipment is not measured by the Dominion Bureau of Statistics method of expressing total sales off farms in milk equivalents, so that, though butterfat supplies have not increased, supplies of solids-not-fat have risen. Sales of milk for manufacture of cheese, ice cream and concentrated products, for example, increased by nearly 5 per cent from 1965 to 1967. Finally, the incentives for expanding production may well have appeared less to producers because of uncertainties about the federal dairy programmes.

Appendix II.B

The Consumer Cost of Market Price Supports

The cost to consumers of supporting market prices can be measured, as in Table II.1 for butter, by comparing the actual domestic price with the (world) price which would have obtained in the absence of price supports. In the case of butter this cost is attributable mainly to the embargo on imports, but also to the increase in prices above the domestic equilibrium level maintained through government offer-to-purchase programmes. The difference between world and domestic prices multiplied by the domestic disappearance of the product is a measure of the additional expenditure incurred by consumers on account of the support programmes. (For example, see Table II.1.) However, this measure fails to allow for the fact that consumers would have purchased more of the product if its price had been lower, and thereby underestimates the full cost of a price support programme to consumers. In the case of butter the total costs to consumers of market price supports can be calculated readily and are shown in the following table for the years 1957-1967, on the assumption of a perfectly elastic import/supply function.

Consumer Cost of Butter Price Supports -- Two Measures

Year	Montreal price less London price multiplied by Canadian domestic disappearance	Total cost to consumers
	----- \$(millions) -----	-----
1957	81.8	100.3
1958	112.6	144.5
1959	71.2	85.6
1960	75.4	92.4
1961	88.7	110.5
1962	48.8	56.4
1963	24.6	26.2
1964	24.2	25.7
1965	34.3	37.2
1966	65.2	75.0
1967	77.5	90.8

However, in assessing the consumer cost of the butter support programme it should be appreciated that had Canada imported virtually all its butter needs the world price for butter would have been somewhat higher. World trade in butter has been about 1,320 million pounds in recent years, with the United Kingdom accounting for over 80 per cent of total imports and New Zealand contributing about 50 per cent of all exports. Clearly, if Canada were to start importing 400-500 million pounds of butter this would substantially increase the import demand for butter and the world price. A more gradual shift to imported sources of butter, however, would permit adjustment in world markets (particularly expansion of New Zealand production) to occur, and price increases would be much more modest.

In the absence of a quantitative analysis of the world butter market, the simpler measure of the consumer cost of the price support programme has been used in the discussions in the text.

Appendix IV.A

Ingredient Costs per Imperial Quart for Dairy and Substitute Milks, United States and Canada^a

Pounds	-----United States-----		-----Canada-----	
	Rate - - - - (¢)	Cost - - - -	Rate - - - - (¢)	Cost - - - -
(a) Liquid skim milk and vegetable oil				
Liquid skim [*]	1.27 (3.51)	3.16 (8.74)	1.22 (3.99)	3.04 (9.94)
Vegetable oil	17.00	1.43	21.00	1.76
Emulsifier-stabilizer	1.00	.01	2.00	.01
Total		4.60 (10.18)		4.81 (11.71)
(b) Skim milk powder and vegetable oil				
Skim powder	21.00	5.23	21.00	5.23
Vegetable oil	17.00	1.43	21.00	1.76
Emulsifier-stabilizer	1.0	.01	2.00	.01
Water	2.2410			
Total	2.5800	6.67		7.00
(c) Soya flour and vegetable oil				
Soya flour	8.00	1.99	14.00	3.49
Vegetable oil	17.00	1.43	21.00	1.76
Emulsifier-stabilizer	1.00	.01	2.00	.02
Water	2.2360			
Total	2.5800	3.43		5.27

^a Adapted from Substitute Dairy Products, unpublished mimeo, Department of Agricultural Economics, Michigan State University.

^{*} Liquid skim priced at manufacturing milk prices (fluid milk prices) net of butterfat value. Prices used: manufacturing milk \$4.00(U.S.), \$3.50(Can.); fluid milk \$6.00(U.S. & Can.), butterfat 82¢(U.S.), 70¢(Can.).

Appendix V.A

An Estimate of the Price Elasticity of Demand for Fluid Milk

Reliable time series data on fluid milk consumption in Canada prior to 1957 is not available. Even the data relating to the years 1957-60 is suspect since it indicates an extremely large decline in per capita consumption; indeed, there are good reasons to believe that the decline is mainly the result of statistical interpolation of revisions of estimates for years between the Census benchmarks 1956 and 1961. According to Dominion Bureau of Statistics, it is the estimates of "milk sold or distributed very locally by producers or by plants with volume below licensing requirements" which were the main sources of needed revision.* Apparently the Dominion Bureau of Statistics in revising its estimates of milk consumption for the period 1957-63,** did not accept the 1956 Census reports of such direct sales and instead used estimates which were several times larger, but assumed a rapid decline in sales through these channels.*** Thus, the estimates of fluid milk sales for 1957 were revised downwards by 5 per cent, while those for 1961 were revised down by 15 per cent. It seems probable that direct sales were much less important in 1956 than the Dominion Bureau of Statistics has assumed, and consequently that the rate of decline in the late 1950's was actually much less than published statistics indicate.

Analysis of the demand for fluid milk over the period 1957-66 is made difficult also by the extreme stability of retail prices relative to the Consumer Price Index. In terms of 1949 dollars, the full range of retail prices for fluid milk over this period was 0.6 cents per quart. As an alternative, nominal prices

* Summary Report of the Seventeenth Federal-Provincial Conference on Agricultural Statistics, 1966, Dominion Bureau of Statistics, Agriculture Division, pp.89-92.

** Dairy Statistics, 1962-63, Dominion Bureau of Statistics, Cat. #23-201.

*** Summary Report, op. cit.

also were used on the assumption that consumer reaction to administered, and therefore publicly announced, price changes was consistent with a money illusion. However, neither real nor nominal price variables yielded significant and meaningful demand relationships. It is most probable that these difficulties resulted from (a) the quality of the statistical series on total fluid milk consumption, (b) the effect on prices actually paid by consumers of shifts from home delivery to store purchase, from single to multi-quart containers, and from standard to two per cent milk.

In order to arrive at an estimate of the price elasticity of demand for fluid milk, attention was focused on the strictly commercial sales for the three years 1965, 1966, and 1967.* After adjusting for downward trends in per capita consumption (by taking first differences) a price elasticity of $-.276$ was obtained. This result may be compared with estimates made in the United States which indicate a price elasticity for fluid milk of $-.20$.**

* Fluid Milk Sales, Dominion Bureau of Statistics, are released sooner than the total consumption estimates given in Dairy Statistics.

** Stewart Johnson, "The Effect of Price on Milk Consumption," Sixth National Symposium on Dairy Market Development, American Dairy Association, February 14-15, 1966.

Appendix V.B

Real Margins and Retail Prices for Dairy Products, Canada, 1957-67^a.

----- Retail Prices ^b . -----		----- Margins ^b . -----					
Fluid milk	Butter	Cheese	Fluid milk farm-retail	Butter-skim powder farm-wholesale	Cheese farm-wholesale	Butter wholesale-retail	Cheese wholesale-retail
¢/qt.	¢/lb.	¢/lb.	-- \$ per 100 lbs. whole milk -- --				¢/lb.
1957	18.5	53.9	58.4	3.43	1.03	1.07	29.4
1958	18.5	55.3	57.4	3.48	.96	1.00	29.5
1959	18.5	55.0	57.7	3.45	.85	.91	28.9
1960	18.5	54.5	57.2	3.45	.66	.80	31.6
1961	18.2	54.1	56.5	3.36	.54	.88	30.7
1962	18.1	47.5	55.9	3.34	.57	.86	29.3
1963	18.2	44.0	56.5	3.45	.72	.92	28.9
1964	18.2	43.5	57.2	3.40	.89	.84	29.7
1965	18.0	44.3	58.0	3.37	.79	.94	29.0
1966	18.6	46.6	59.9	3.50	.75	1.07	28.0
1967	19.4	47.2	59.9	3.64	.72	1.09	29.6

^a. Sources: derived from data published in Dairy Statistics, D.B.S., Cat. #23-201 and Prices and Price Indices, D.B.S., Cat. #62-002.

^b. Deflated by Consumer Price Index.

Appendix V.C

Projected Sales of Two Per Cent Milk

The dietary and price appeal to consumers of two per cent milk over standard milk and the incentives for dairies to promote sales of the low fat milk will undoubtedly result in a rising share of two per cent sales in the fluid milk market. Logically, however, the share of two per cent sales can be expected to increase at a declining rate as the two per cent proportion of sales becomes larger, and historical data for the Toronto market support this expectation. On these assumptions, two per cent sales were projected to account for 42.5 per cent of the fluid milk market in 1975, and for 51.7 per cent in 1980.* These proportions were applied to the projections of fluid milk sales to obtain estimates of future sales of two per cent milk. The implied total yield of butterfat associated with these sales was converted to whole milk equivalents and deducted from total off-farm sales and from total domestic disappearance to avoid double counting.

* Half-yearly averages for the period January-June 1964 to July-December 1967 were used as observations in a regression of the proportion of standard milk sales on a time variable, with the dependent variable only expressed in logarithms. The proportion of two per cent sales were obtained as the complement of the market share of standard milk.

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